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THE IRON AGE

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▲▲▲ THE IRON AGE ▲▲▲

NOVEMBER 30, 1939

ESTABLISHED 1855

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Poor Old Earl

WE notice that Earl Browder, chief of the American Communist party, is being kicked around a bit nowadays. Even the First Lady, Mrs. Eleanor Roosevelt, has recently put him on her publicity frying pan in order to try out his adherence to the American form of government.

Poor old Earl. To what depths have the mighty fallen! To think that times could change so that an honest Communist, who openly admitted his affiliations and his belief in the advantages of the Communist philosophy, could be subjected to a public pillorying in this home of the free and land of the brave.

Poor old Earl. Your experience shakes our faith in the ancient proverb that "honesty is the best policy." You never tried to conceal the fact that you were a Communist. You may have, as the Government claims, sailed under false passports abroad, as have many other distinguished Americans, but you have never sailed under false colors at home in this country. No one was ever left in doubt as to your beliefs and affiliations.

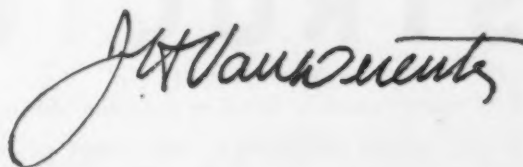
That is more than can be said for a lot of your fellow travelers. Many of them have disavowed the precept that "honesty is the best policy" and adopted in its stead "Let not your right hand know what your left hand is doing." (With accent on the left.)

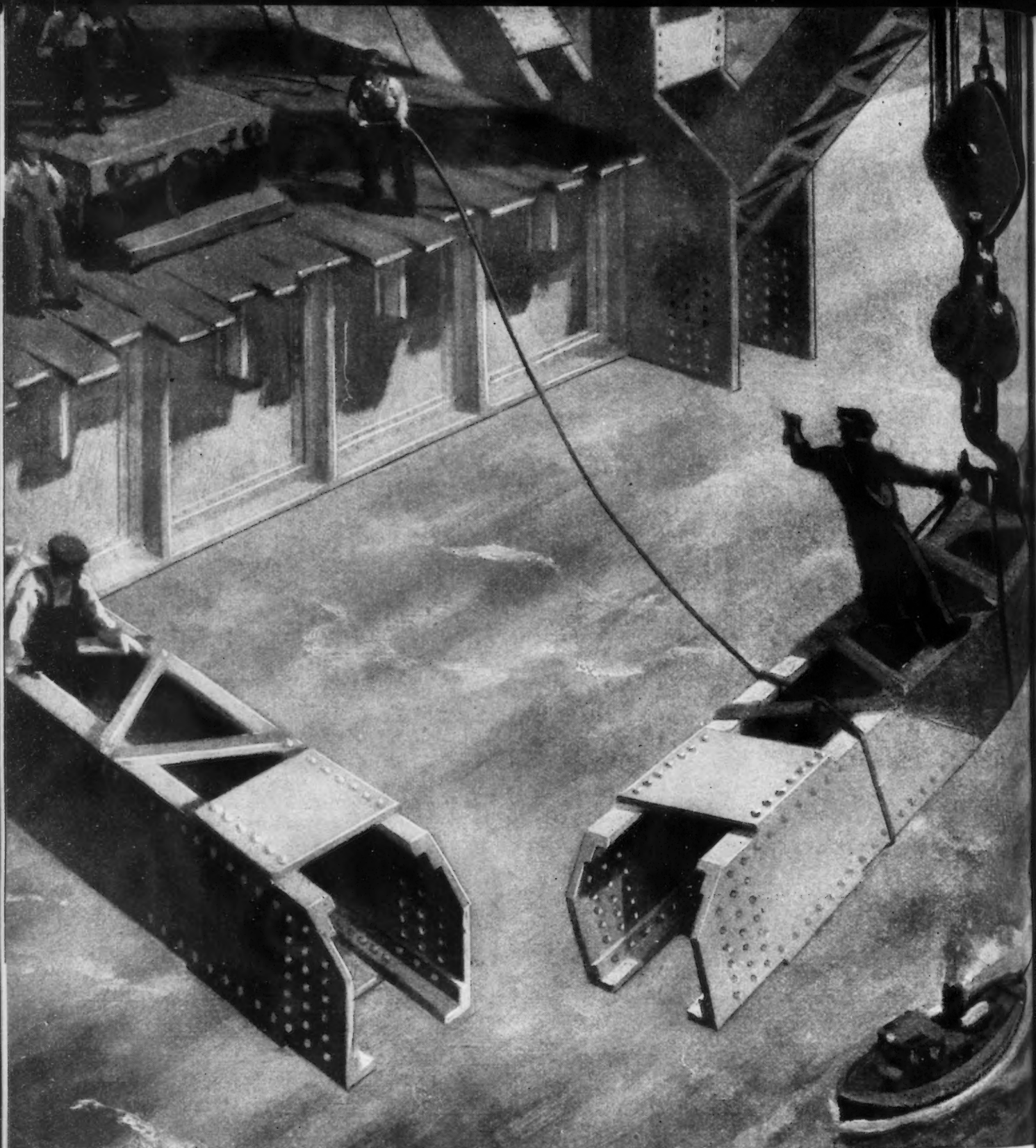
Of course, Earl, your political power was done for when Joe signed up with Adolf. Done for in this country, in which some of our best people had held such high regard for the noble experiment in Russia. Now, anyone can throw stones at you and get away with it. As long as Joe was merely a noble experimenter, with no ties to Berlin, nobody threw bricks at his disciples in this country and got away with it. There were too many glass houses within range, occupied by both noble and ignoble domestic experimenters.

Good bye Earl. You are all washed up as an American Communist. But let us give you a word of advice for the future.

Maybe, in your next reincarnation, you will find yourself in South America. Naturally you will have the same affiliations as you have now, for once a Communist, always a Communist. But don't be foolish this time. Don't admit it, whatever you do. If you are charged with being one, deny it. Then, if you are "put on the pan," perhaps after seizing control of shipping labor on both South American coasts, thereby getting the continent into your power, nobody will be able to do anything to you. And the South American Department of Labor will come to your rescue against an aroused citizenry, if it should come to a showdown.

Live and learn, Earl. We all have to.





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SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS

Gas Content VS STEEL BEHAVIOR

By GEORGE T. MOTOK

General Metallurgical Research,
Republic Steel Corp.,
Massillon, Ohio

ALL too frequently, steel in the same heat or from heat-to-heat has variations in characteristics not revealed by routine chemical, metallurgical and physical tests. But, the variations are revealed by Republic's vacuum extraction technique, wherein a study can be made of oxidation products which remain in the steel and determinations made of nitrogen, oxygen, etc. Herein, in the first section of a two-part article, the author points out the effect of gases and oxides, mentions some details of the extraction procedure, and gives the case history of variation in the hardenability of a die steel.

IN many cases a steel, although of a specified chemical composition, will not respond to heat and mechanical treatments in the fashion expected, nor possess the anticipated physical and chemical characteristics. These departures from the expected characteristics of steels of the same chemical analysis are also found *even in different parts of the same heat*.

A number of more-or-less vague terms, such as "personality," "body," and "sensitivity," have been used from time to time to designate those inherent characteristics which are not revealed by any of the routine chemical, metallurgical, or physical tests.

The methods used in examining the characteristics of steel are, of course, pretty much limited to the ordinary analyses of the common elements present in the steel. But, frequently in

Republic's experience, at least, such elementary analyses do not supply a sufficiently tangible answer for the observed behavior of the metal, and it is considered most important to apply more searching methods of examining the steel.

Such research is already substantiating the suspicion that the presence in the steel of even small amounts of some elements which, heretofore, were only studied from the academic point of view, can now explain some of the characteristics which were previously attributed to the "personality" or the "body" of the steel.

These elements are gases—oxygen, nitrogen, and hydrogen. Oxygen, nitrogen and hydrogen are present in practically all metals in one or more of the following forms: (1) molecular gas in blowholes or blisters, (2) com-

bined in non-metallic inclusions such as nitrides, oxides or silicates, and (3) in solid solution in the metal. Gaseous elements, in some of these forms, are encountered in practically all metals and alloys but possibly have received most publicity in connection with iron and steel. In fact, the entire steel industry depends upon the control of the oxygen content during the refining process, as well as in the finished material.

In normally clean, sound steel the amount of hydrogen is negligible and the amounts of oxygen and nitrogen vary from a few thousandths to a few hundredths of a per cent.

OXYGEN: The presence of oxygen is believed to affect the solubility of carbon in austenite and ferrite and thereby to affect the structure of the iron or steel. Such properties as strength, hardness, ductility, elastic limit, impact resistance, magnetic permeability, tendency toward caustic embrittlement, irregularity in carburization, certain corrosion phenomena, the presence of flakes, seams, bands, ghost lines and hair cracks, and the tendency to age-harden, all have been attributed to the presence of oxygen.

NITROGEN: The influence of nitrogen in steel is generally regarded as af-

TABLE I
Gas Content of Steels—Per Cent by Weight

Open-Hearth Steels			
Grade	Oxygen	Hydrogen	Nitrogen
SAE 2015	0.0065 to 0.0257	0.00048 to 0.00195	0.0029 to 0.0069
SAE 2340	0.0067 to 0.0098	0.0006 to 0.0024	0.0032 to 0.0050
SAE 4615	0.0011 to 0.1021	0.0001 to 0.0033	0.0020 to 0.0194
2 $\frac{3}{4}$ Ni-Mo	0.0010 to 0.0104	0.00005 to 0.00131	0.0020 to 0.0054
Electric Furnace Steels			
Grade	Oxygen	Hydrogen	Nitrogen
SAE 1035	0.0108 to 0.0140	0.00036 to 0.00041	0.0077 to 0.0113
Amola	0.0044 to 0.0066	0.00007 to 0.00031	0.0079 to 0.0133
SAE 4615	0.0083 to 0.0305	0.0005 to 0.0024	0.0062 to 0.0146
SAE 3115	0.0008 to 0.0181	0.00026 to 0.00127	0.0063 to 0.0157
SAE 4320	0.0020 to 0.0077	0.00054 to 0.00057	0.0066 to 0.0069
SAE 6130	0.0056 to 0.0152	0.00016 to 0.00037	0.0051 to 0.0140
Cr-Mn	0.0123 to 0.023	0.00008 to 0.00017	0.0089 to 0.0143
SAE 52100	0.0112 to 0.0181	0.00083 to 0.00183	0.0066 to 0.0106
C-105	0.003 to 0.113	0.00009 to 0.0182	0.0012 to 0.0322
SAE 9260	0.0042 to 0.0063	0.00015 to 0.00024	0.0068 to 0.0078
SAE 9260 plus Mo	0.0050 to 0.0070	0.00026 to 0.0003	0.0074 to 0.0094
18-8	0.01754 to 0.0322	0.00026 to 0.00141	0.0324 to 0.0414
18-8 Cb	0.0164 to 0.0235	0.00070 to 0.0020	0.0310 to 0.0381
HC Stainless	0.0077 to 0.0610	0.00050 to 0.0007	0.1879 to 0.2050
Mn-Cr Stainless	0.018 to 0.023	0.0009 to 0.0010	0.0607 to 0.097

fecting the hardness, ductility, tensile strength, elastic limit, and magnetic properties of steel, and has been suspected as a cause for blue brittleness or temper brittleness, age-hardening, and blistering of sheets during annealing. Nitrogen seems to have about four times the effect of an equal amount of phosphorus on the mechanical properties of steel and this effect may be further intensified by the presence of carbon or alloying elements.

In the field of cast iron, nitrogen has been blamed for the production of unsatisfactory malleable iron. Also, the age-hardening and embrittling effects of nitrogen in weld metal and in weld joints recently has attracted some attention.

HYDROGEN: Although usually present only in negligible amounts, if pres-

ent in larger amounts hydrogen may affect the properties of the metal to a noticeable extent. The brittleness of freshly deposited electrolytic iron and the brittleness which follows certain types of pickling, for example, have been attributed to the presence of hydrogen.

The gas content of steel can be controlled by the method of manufacture and attendant variations, and therefore it varies according to the process or grade of the steel. Such variations in gas content of different steels is illustrated in Table I, in which they are grouped according to grade.

The range of gas content is presented to show what can be expected, and the upper limit of gas content does not necessarily mean that the steel is of poor quality. However, the variation in gas content explains why a steel is

more susceptible (or has "body") than another.

The results given in Table I represent a cross-section of several hundred samples of steels examined by the Republic vacuum fusion method.

Gases and Oxides in Steels

The presence of oxygen, hydrogen, and nitrogen in small amounts in all steels is, of course, well known. Where steels of similar chemical composition and subjected to the same mechanical and thermal treatment show a difference in quality and performance, the belief has developed that the difference in the gas and oxides content is of great importance. The gases in steel exist as oxides, nitrides and hydrides, as well as uncombined oxygen, nitrogen and hydrogen. The small quantities of oxygen present in commercial steels do not afford a clear idea of its effects on most of the properties of steel. And, of course, a quantity of oxygen in steel is not at all the decisive factor in many cases; but rather the manner in which this oxygen is combined and distributed throughout the steel.

Vacuum Method for Gas Analysis

The results of many investigations show that the determination of the oxygen in steel is becoming more and more important to the metallurgist. The need of methods for determining gases in steels has long been recognized, but very few such methods have come into any wide use or have given data which are sufficiently complete or uniform to permit a satisfactory correlation between the gas content of the steels and their qualities.

The vacuum method, for the determination of total gases in steels, does not differentiate the combined forms in which oxygen is distributed in steel. Oxygen, as iron and manganese oxide, or other oxides with melting temperature below that of the rolling of such steel, has less harmful effects than the more refractory oxides found in the steel.

To differentiate between these two general types of oxides; and also to determine them quantitatively, the vacuum fusion method by partial extraction at different elevated temperatures at which the oxides or complex compounds of iron, manganese, silicon, or aluminum, as well as other metallic oxides are individually reduced, has been applied in Republic's research laboratories at Massillon, Ohio, with consistently encouraging results.

As originally outlined in an article

TABLE II
Results of Vacuum Extraction of Gases and Oxides

		Steel A		
Temperature of Extraction, Deg. F.	Probable Oxides Reduced	Oxygen	Hydrogen	Nitrogen
1960	FeO	0.00039		0.0020
2200	MnO	0.00117	0.00005	0.0027
2500	SiO ₂	0.00078	0.00015	
2900	Al ₂ O ₃ -Al Silicates	0.00784	0.00039	0.0007
	Total	0.01018	0.00059	0.0054
		Steel B		
1960	FeO	0.00049	0.00012	0.0034
2200	MnO	0.00194		0.0017
2500	SiO ₂	0.00778	0.00012	
2900	Al ₂ O ₃ -Al Silicates	0.00972	0.00042	
	Total	00.1993	0.00066	0.0051

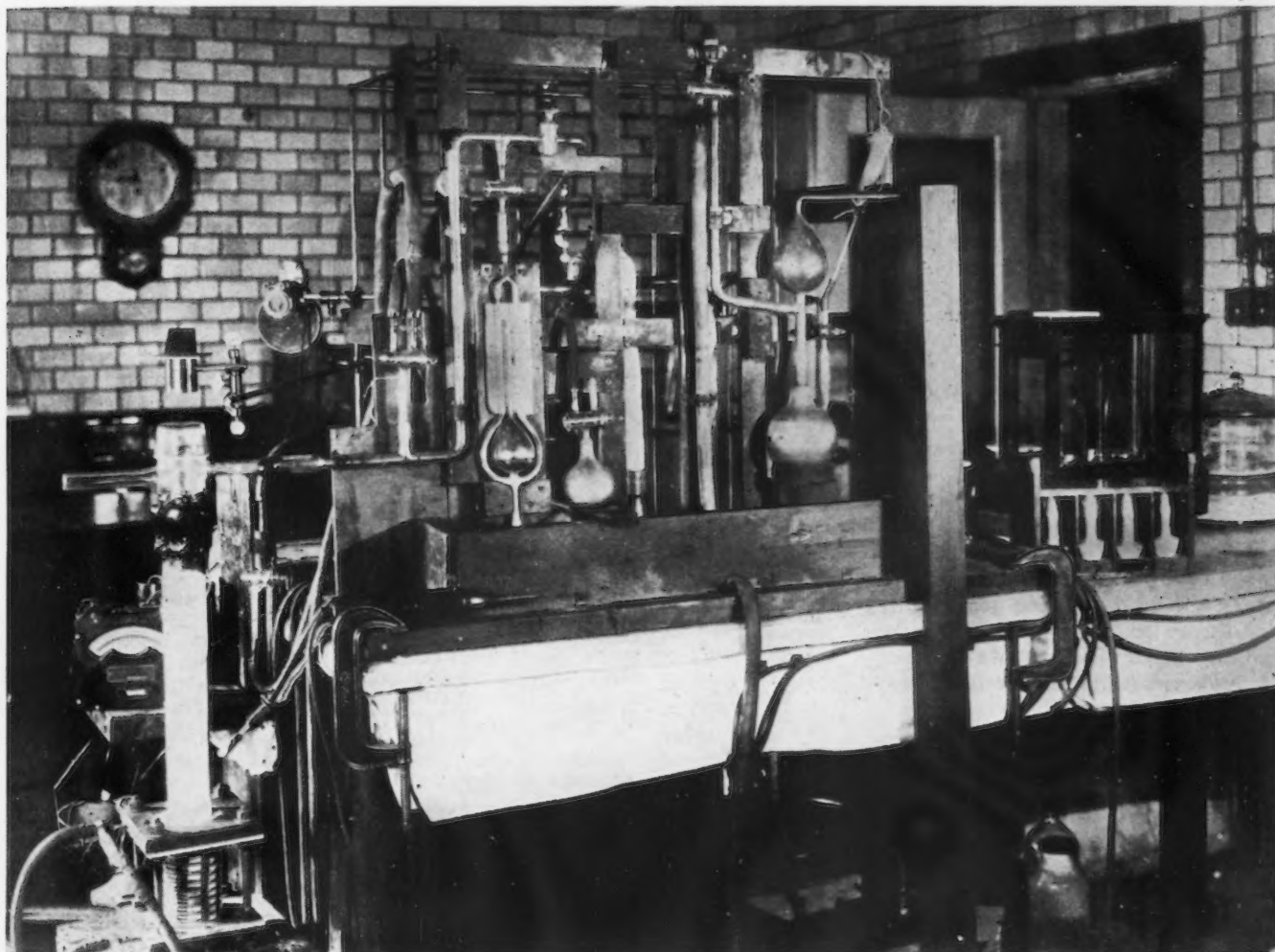
which appeared in the Oct. 1, 1936, issue of *THE IRON AGE*, this improved method consists in heating an alloy of steel and tin in a graphite crucible in an extremely high vacuum. The carbon from the graphite enters the molten steel and reacts on the oxides individually, depending on the temperature of extraction. Nitrogen, hy-

dreds of cases which, over the past four years, have been studied in the Massillon laboratory.

The additional information brought to light by the gaseous content analyses in all of these cases is indicative of the more complete picture of a steel's characteristics and performance possibilities which this more detailed

0.025 S, 0.15 to 0.25 Si, and 0.05 to 0.15 Cr.

Studying the results shown in Table II, obtained by the vacuum extraction of gases and oxides, it was found that steel A, which hardened without difficulty, contained a smaller amount of oxides than did the softer steel B. Taking one oxide at a time, it was



REPUBLIC Steel's vacuum fusion extraction apparatus, as developed in its general metallurgical research laboratory in Massillon, Ohio, was first applied to fractional gas determinations. It has now been carried to the point where total gas determinations are regularly being made.

drogen, and oxides of carbon are evolved, collected and analyzed by means of standard gas analysis methods. The iron oxides are reduced first, then at higher temperatures the manganese oxides, silicates and aluminum oxides, are progressively extracted.

As examples of the more complete and comprehensive information which is to be obtained from a gas analysis of a steel than is available from the ordinary routine analysis of the common elements present in it, data have been brought together in the following paragraphs on just a few of the hun-

and exhaustive method of examination and study provides.

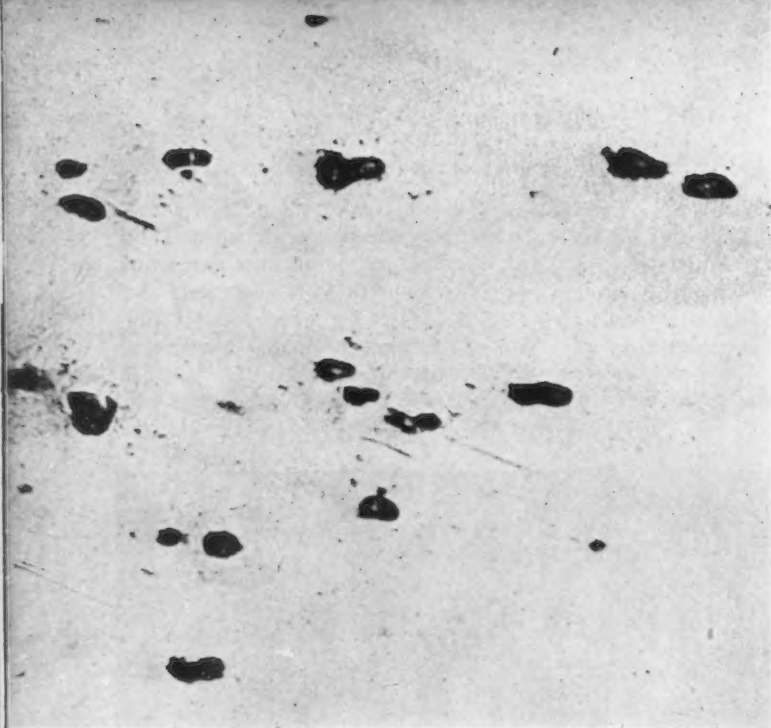
CASE I

Of two steels used for making dies, one could be hardened without difficulty to Rockwell C-70. The other steel would occasionally reach the required hardness, but normally would not go above R. 66. Also, in the latter steel, difficulty was encountered with "soft" spots.

The chemical analyses of both steels lay in the following range: 1.25 to 1.30 C, 0.25 to 0.35 Mn, 0.025 P,

found, for example, that there was a smaller amount of each of the oxides in the better-performing steel. The silicon oxide in the poorer-performing steel was about 10 times as great.

These results indicated that during the steel making the poorer steel was oxidized more than the better one, and on adding the deoxidizers the poorer steel retained more oxides because the steel contained more oxygen to start with. Adding more deoxidizers to an over-oxidized molten steel does not clean the steel. The cleanliness of the steel is obtained prior to



ALUMINUM
oxide (Al₂O₃)
inclusions in alu-
minum-killed
steel; as polished
and at 1000 di-
ameters.

the refining. The type of charge and melting down period are the important factors affecting the cleanliness of the steel. Moreover, steel B showed soft spots because the oxides, which are not evenly distributed, prevented the uniform distribution of carbon.

From the above results, while there was no difference in hydrogen and nitrogen content of both steels, it was noticed that most of the hydrogen was given off at the highest temperature of extraction, whereas most of the nitrides (such as Fe and Mn nitrides) were dissociated at the lower temperatures.

Here, as in additional examples which will be given in the following paragraphs, the use of the vacuum extraction of gases and oxides revealed hidden factors and supplied the reasons for the characteristics of a steel which could not be ascertained by the ordinary testing methods.

CASE II

Tests were run on two samples of silicon-killed steel. Both samples were

from the same plate. One showed a good nick-break test, the other showed a poor test.

The steel analyzed chemically as follows: 0.14 C, 0.40 Mn, 0.21 Si, 0.028 S, 0.018 P, 0.13 Cu, and 0.088 Ni. The ferromanganese was added in the furnace, and the heat was killed in the ladle with ferrosilicon. No aluminum was added.

The ingot was rolled into a 2-in. plate. The material tested was in the as-rolled condition and had received no further heat treatment.

In Table III are the tabulated results for the vacuum-fusion determination of gases and oxides.

A study of the vacuum-fusion results showed a high oxygen content appearing in the form of MnO. This MnO might have been left from the reaction after the ferromanganese addition in the furnace. The oxygen extracted at 2500 deg. and 2900 deg. F. must have appeared as SiC₂. Hence, according to the information given, the

TABLE III
Results of Vacuum Extraction of Gases and Oxides

Sample No. 1, which showed good nick-break test:

Temperature of Extraction in Vacuum, Deg. F.	Probable Oxides Reduced	Per Cent by Weight of Gases Extracted		
		Oxygen	Hydrogen	Nitrogen
2000	FeO	0.00086	0.00004	.....
2200	MnO	0.00634	.....	0.0005
2500	SiO ₂	0.00374	.....	.....
2900	Al ₂ O ₃	0.00374	0.00014	0.0025
Total		0.01468	0.00018	0.0030

Sample No. 2 which showed a poor test:

2000	FeO	0.00064	0.00004	0.0011
2200	MnO	0.00730	0.00004	.....
2500	SiO ₂	0.00381	.....	0.0006
2900	Al ₂ O ₃	0.00413	0.00028	0.0050
Total		0.01541	0.00036	0.0067



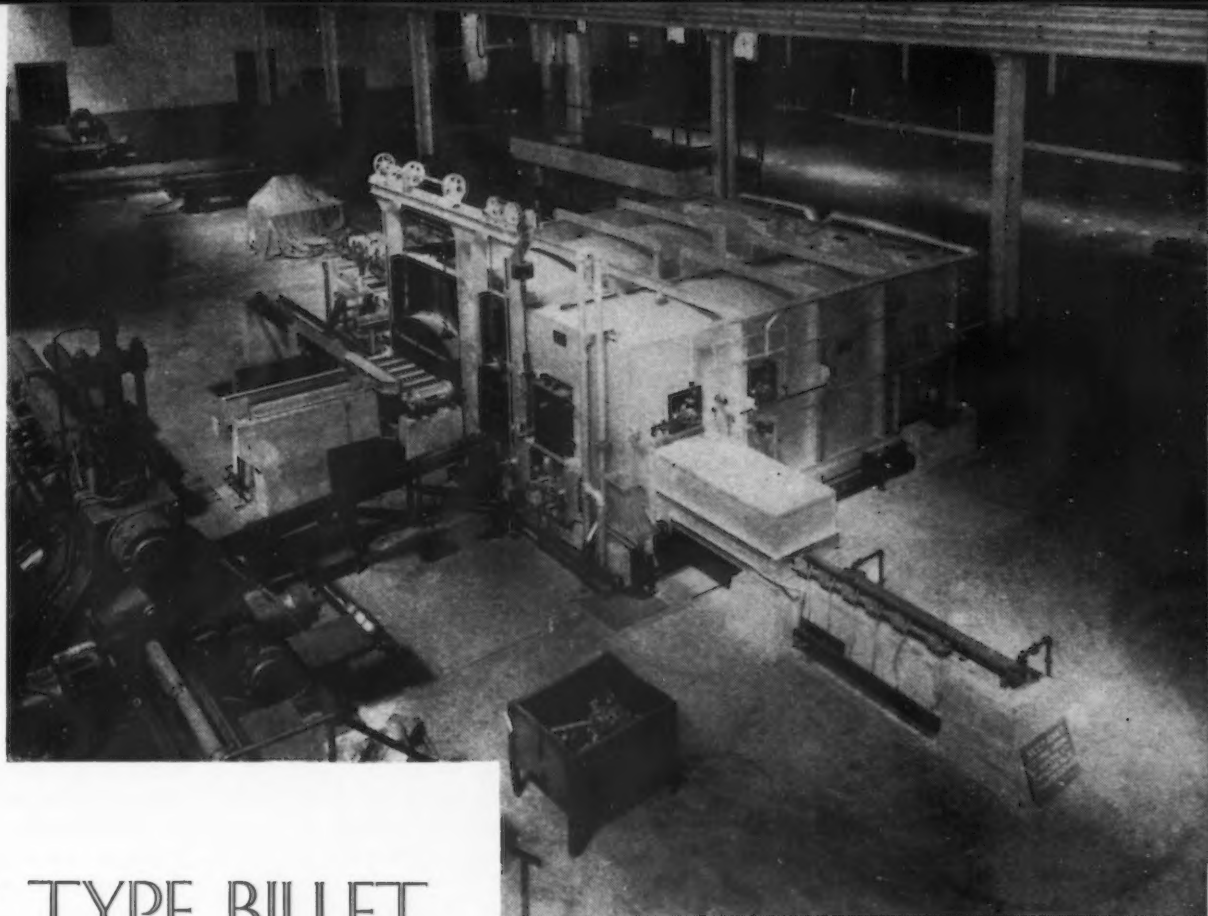
IRON oxide
(FeO) inclusions
in ingot iron; nital
etch, at 500 di-
ameters.

heat was killed with ferrosilicon in the ladle, without any aluminum addition.

The second sample, which showed a poor nick-break test, had twice as much hydrogen and nitrogen as the first sample. This difference in hydrogen and nitrogen accounts, it is believed, for the difference in performance of the two samples, since hydrogen as well as nitrogen was found to cause the formation of flake or hair cracks—in some cases causing brittleness.

Ed. Note:—Next week the author continues with case histories showing correlation between gas analyses and variations in performance of welding steels, spring steels, and stainless steels.

THIS square rotary billet heater takes care of the requirements of the extrusion press in the left foreground. At the left front of the furnace doors may be seen some of the billets ready for heating. The conveyor at the front center of the heater carries the billets to the extrusion press.



NEW TYPE BILLET HEATER FOR BRASS MILL

A NEW type of billet heater, developed by Continental Industrial Engineers, Inc., Chicago, has recently been placed in operation by a large Connecticut brass mill. Used in place of the old roll-down and pusher type furnaces, with their manual labor, and hearth-dragging, this new heater consists of a rectangular housing, divided into three temperature zones, through which are pushed a series of 17 insulated trays containing the billets.

This new heater is particularly designed to meet the trend toward higher billet temperatures caused by the popularity of copper-nickel and other high temperature alloys requiring 1900 to 2000 deg. F. for proper manipulation. The desire to get away from excessive scale and other foreign matter was occasioned by the use of many of these billets for extrusion purposes. At this mill, an extrusion press produces seamless tubing from the billets, 100 an hour being the maximum that can be handled.

The heater is arranged so that the loaded trays are always entirely within the furnace, yet automatic loading or unloading is still possible. In this particular case, an automatic air pusher shoves a load of cold billets onto a

tray, which is in turn pushed about the sides of the rectangular furnace by hydraulic pushers actuated by automatic interlocks. When the press operator desires a heated billet, he presses a button at his machine, which causes one billet to be pushed through an automatic door onto a conveyor leading to the press. The heating cycle is so arranged that the trays come to the discharge door at maximum temperature. The loading of the cold billets into position for charging into the heater is the only manual operation—all others are automatically governed by the press operator and his push button controls.

After discharge the hot empty trays return to the loading position for almost instantaneous reloading, thus minimizing cold hearths and cold spots on the billets. Rapid heating is attainable in this furnace because the trays are at near-maximum temperature when a new load is received. From the loading position the trays proceed through pre-heat, heat and soaking zones, the complete circuit averaging 90 min. to 2 hr. time. Each zone is provided with two burners, and is closely sealed and controlled, so that constant maximum temperatures may be maintained. The zones are separat-

ed by refractory walls or partitions. The maximum temperature of the soaking zone is constant, so that overheating of the billets, or scaling, is impossible if there are press delays.

Fuel consumption is said to be quite low because of the tightly sealed housing and the travel of the hot products of combustion counter to the flow of material, which results in the high temperature gases giving up their heat to the hottest billets and the cooler gases heating the cold entering billets just prior to exhaust. This close atmosphere control also makes it possible for delivered billets to be clean and bright, the only scale resulting from time spent on the conveyor between furnace and press.

The trays, which measure 24 in. x 5 ft., are covered with refractory material containing 5 grooves to hold the billets. Depending on the length of the billets, from five to ten may be handled on each tray automatically. Outside diameter may range from 2 to 8 in. without change in the automatic handling equipment.

Capacity of this installation in the brass mill is around 10,000 lb. an hr. but varying capacities are available, as not only non-ferrous metals, but steel and alloys may be accommodated.

Control of SULPHUR IN BASIC OPEN HEARTH

THIS research is particularly timely as it makes available valuable quantitative data on the specific effects of non-metallic inclusions on the physical properties of rimming steels. Last week, in the first section of this three-part report, the authors told of the inclusions found in slabs and rejected sheets. Herein, in the second section, a description is given of the effect of sulphur on grain size and physical properties, and also the sources of sulphur in the open hearth.

By T. L. JOSEPH and F. W. SCOTT*

EFFECT OF SULPHUR ON GRAIN SIZE AND PHYSICAL PROPERTIES OF STRIP STEEL: The segregation of sulphur may affect the grain size, which must be controlled to meet customers' requirements—the type and depth of draw determining whether the grain should be fairly large, small, or of medium size. The limits of permissible variation in grain size are not clearly defined, and what may be good for one job will not be suitable for another. Grain size usually varies from the surface or rim of the sheet to the mid-section, this variation being due to segregation of the metalloids. Also the degree of variation in grain size is proportional to the segregation. Differences of grain size may be attributed partly to the usual temperature differences that exist in the annealing box. However, with little segregation of sulphur, the differences in grain size between surface and center are negligible.

The effect of segregation on the

*Professor of metallurgy and instructor in metallurgy respectively, University of Minnesota.

²T. S. Washburn, J. H. Nead: "Structure of Rimmed Steel Ingots," Trans. A.I.M.E. (1937), 125, 378.

³J. W. Halley and T. S. Washburn: "Distribution of the Metalloids in Rimmed Steel Ingots," Trans. A.I.M.E. (1938), 131, 195.

⁴J. H. Nead: "Absorption of Sulphur from Producer Gas in Open Hearth Furnaces," A.I.M.E., Vol. 70, 1924, pp. 176-185.

physical properties of several samples of strip steel is shown in Table III. The finishing temperatures of the hot mill, the coiling, cold rolling, and annealing processes all were closely controlled in these tests.

It is evident from Table III that varying degrees of segregation of carbon and sulphur exist in strip steel. This is due, of course, to segregation in the ingot, a problem recently investigated by Nead,² Washburn and Halley. The reader is referred to this work for a more detailed discussion of segregation in the ingot.

It is difficult to isolate the effect of sulphur-segregation because it is accompanied by the segregation of carbon. An increase in either of these metalloids increases hardness and decreases ductility, when other factors are constant. There is some evidence, however, which indicates that sulphur may have a rather specific influence. It appears to obstruct grain growth and tends towards an elongated dispersion of carbide. Assume, therefore, that the slab in Fig. 2 (shown last week) has been rolled into a sheet and that cross-sections of the end of the sheet at the edge and near the center are being examined. Fig. 10 shows the structure at the edge of the sheet which was formed from the low sulphur rim zone of the original ingot. The grains are fairly equi-axed, well defined and rounded throughout.

Fig. 11 shows the structure of the end of the sheet near the center and corresponds with the plane of the core samples taken from the slab (see Fig. 2, last week). The top surface of this part of the sheet was rolled from the rim zone and the mid-section was formed from the less pure core zone. A difference in structure is apparent. The top resembles Fig. 10 but in the

mid-section of the sheet the grains show strain and the carbides are dispersed and elongated, giving a typically under-annealed structure.

A case of more pronounced variation in grain size between the surface and mid-section of the center of a sheet is shown in Fig. 12. Here again the surface is from the rim and the mid-section from the less pure core of the ingot. The grains shown in Fig. 13 are more nearly the same size at the surface and at the mid-section of the sheet. They are well rounded, and the Rockwell hardness is B-44, compared with B-56 for the sample shown in Fig. 12.

Proper fabrication of steel depends upon uniformly desirable physical properties. Although ladle analysis may meet the specifications on the customer's order, segregation may impair the quality of the sheets unless sulphur is controlled.

Sulphur in Ladle and in Sheet

Sulphur has a strong tendency to segregate. The maximum concentration in the sheet increases rapidly as the amount in the ladle increases. Data were obtained on low carbon rimmed steel, poured into 24x43x66-in. ingots for strip steel to study the distribution of sulphur. The ingots were split with dynamite and sampled at the points indicated. (See Fig. 1, last week.) The plan of sampling covered four positions relative to the internal structure of the ingot, at several levels relative to ingot height. The positions relative to ingot structure were as follows:

- (A) In the skin zone, close to the ingot surface.
- (B) In the rim zone, close to the secondary blowholes.
- (C) In the core zone, close to the secondary blowholes.

(D) In the core zone, at the center of the ingot.

The analyses of samples from a number of ingots were studied and a general relationship developed between ladle sulphur and the amount in various parts of the ingot. Fig. 14 shows the percentage of sulphur that may be expected in the rim and in the core zones for given ladle analyses. It is assumed that the ladles are poured into the size of ingot studied and that the rimming action and capping time are normal. It is almost impossible, however, to sample a sheet of steel in such a manner that the portion from the core of the ingot is separable from the portion formed from the rim. The center of the sheet contains metal from both the core and rim zones and is the highest in sulphur. Accordingly, this portion of the sheet is the limiting factor. Fig. 15 shows the sulphur content of the center of the sheet for various amounts of sulphur in the ladle and for various ingot heights—0.030 per cent in the ladle corresponds with about 0.046 per cent sulphur in the center of the sheets.

Physical tests, similar to those previously described indicate that the amount of sulphur in the center of the sheet should be not over 0.040 per cent. Sulphur in excess of this amount causes

an excessive increase in hardness and a marked loss of ductility. The center of sheets rolled from the top of the ingot will contain the maximum per cent of sulphur. According to Fig. 15, the ladle analysis must not exceed 0.028 per cent sulphur if the content in the sheets is not to exceed 0.040 per cent. A brief inspection of this figure will show that a rise of 2 points of sulphur in the ladle will be followed by a rise of more than 2 points in the maximum sulphur in the sheet. A ladle sulphur of 0.028 corresponds to 0.040 per cent in the center of the sheet, while 0.030 per cent in the ladle corresponds with about 0.046 per cent sulphur in the center of the sheets.

Sources of Sulphur

A previous discussion has been devoted to the necessity of controlling the amount of sulphur in basic open hearth steel. Factors pertinent to the control of sulphur will now be considered.

In 1924, J. H. Nead⁴ studied the sources of sulphur in the open hearth and isolated the amounts of sulphur absorbed from the fuel. His data from two heats of Armco ingot iron, given in Table IV, show that a large portion of the sulphur in the bath and slag at tap was absorbed from the fuel. He thus concluded that the sulphur in

TABLE III

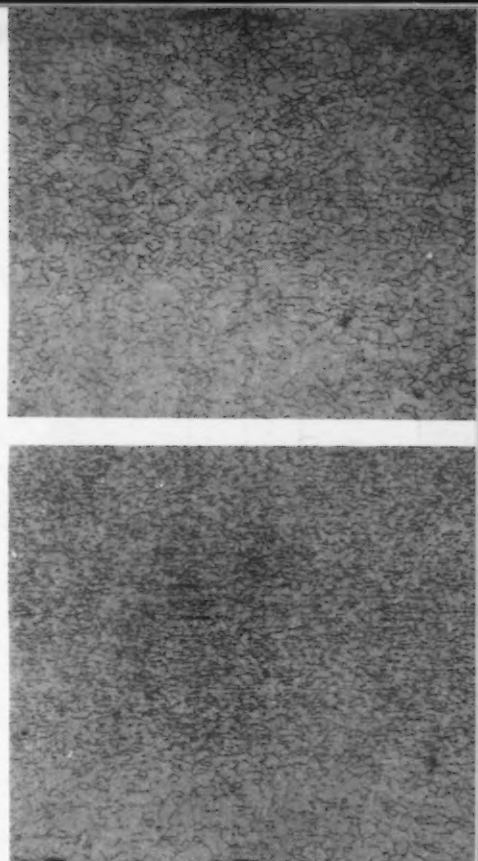
Effect of Segregation on the Physical Properties of Steel
Strip, 0.042 Gage, 62 In. Wide

	Yield Point Lb. Per Sq. In.	Tensile Strength, Lb. Per Sq. In.	Elonga- tion Period	Rockwell Hardness	Olsen Draw	Chemical Analysis, Per Cent	
						C	S
SAMPLE 1							
Edge	34,780	42,520	38.5	B-45	0.412	0.06	0.018
Center . . .	31,350	41,960	38.5	B-45	0.405	0.08	0.019
SAMPLE 2							
Edge	29,470	43,000	38.5	B-41	0.400	0.05	0.021
Center . . .	35,120	44,320	38.5	B-52	0.387	0.09	0.030
SAMPLE 3							
Edge	24,160	37,440	42.0	B-38	0.402	0.06	0.018
Center . . .	33,820	45,170	38.0	B-52	0.370	0.07	0.043
SAMPLE 4							
Edge	28,220	41,820	39.5	B-45	0.390	0.05	0.018
Center . . .	33,340	47,830	35.0	B-59	0.377	0.10	0.042
SAMPLE 5							
Edge	28,520	41,020	40.5	B-48	0.405	0.045	0.019
Center . . .	38,540	49,270	36.0	B-59	0.376	0.10	0.045

TABLE IV

Sources of Sulphur in the Open-Hearth at Tap (Nead)

	Lb. Sulphur from Pig Iron	Lb. Sulphur from Steel Scrap	Lb. Sulphur Absorbed by Bath During Melt-Down	Lb. Sulphur in Slag and Metal at Tap	Lb. Sulphur Absorbed Dur- ing Refining
Heat No. 1	19.0	38.7	35.3	98.2	5.2
Heat No. 2	16.9	38.2	25.2	90.8	10.5



ABOVE

FIGS. 10 and 11—Showing the pronounced variation in grain size between the edge and center of sheet. Fig. 10 (at top) edge of sheet, R_n47 , carbon 0.07, sulphur 0.020. Fig. 11 (below) center of sheet, R_n54 , carbon 0.08, sulphur 0.030. Both views, nital etch and 100 diameters.

BELOW

FIGS. 12 and 13—Showing that with same grain size at surface of sheet, mid-section grain size may vary greatly, affecting hardness of sheet. Fig. 12 (below) center of sheet, showing extreme variation in grain size between surface and mid-section, R_n56 . Fig. 13 (at bottom) center of sheet, showing more uniform grain size, R_n44 . Both views, nital etch and 100 diameters.



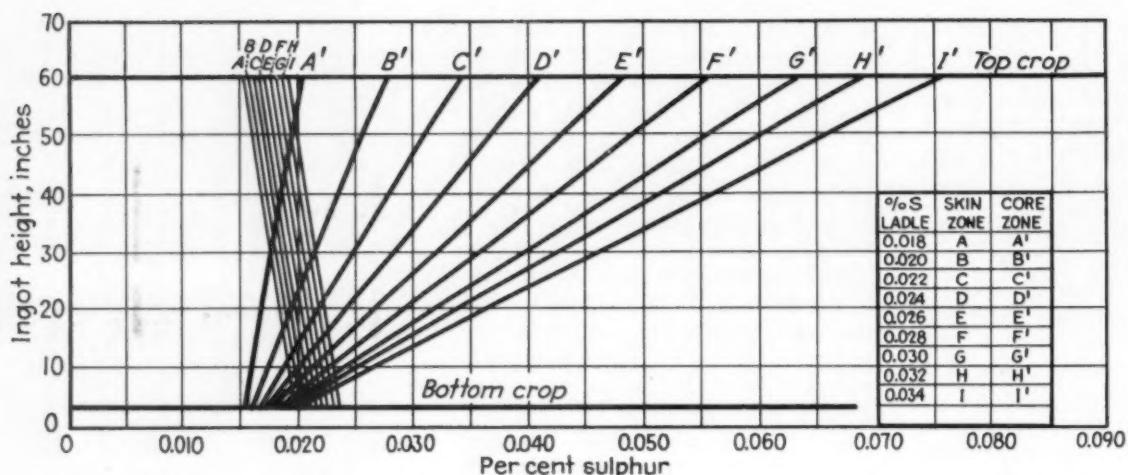


FIG. 14—Relationship between ladle sulphur and the mean sulphur in skin and core zones in rimming steel ingots, at various ingot heights

producer gas imposes a greater burden of desulphurization on the slag than if a lower sulphur fuel were used.

The following year, C. H. Herty⁵ and others published the results of an exhaustive study of the factors affecting the elimination of sulphur in the basic open hearth process. They found a direct relation between the concentration of sulphur dioxide over the bath, the amount of sulphur picked up by the scrap during melting, and the sulphur in the basic slag when time had been allowed for equilibrium to be established. This latter relation is shown in Fig. 16. To prevent sulphur absorption, the gases in the furnace should not be in excess of 0.035 per cent SO₂. Accordingly, coke oven gas would have to be scrubbed so as not

to exceed 135 grains of sulphur per 100 cu. ft. to prevent absorption of sulphur.

The study also indicated that considerable savings could be accomplished at the blast furnace if no sulphur were introduced by the fuel in the open hearth. The elimination of the absorption of sulphur in the open hearth would permit the use of high sulphur pig iron, about 0.080 per cent, thus increasing capacity of the blast furnaces, lowering fuel and limestone consumption. The open-hearth would also benefit by eliminating time lost on high sulphur heats. Greater tonnage would result from lower limestone charges and the smaller volume of slag required.

In 1926, C. H. Herty, Jr.,⁶ reported the results of further study concerning the absorption of sulphur during melting in the open hearth furnace. He determined the SO₂ in the gases over the bath in relation to the sulphur in the fuel, as shown in Table V. Using the table, with the data given in Fig. 16, the equilibrium value for sulphur between the slag and the sulphur in the fuel may be determined.

Herty's studies indicated that the sulphur content of the finished steel was proportional to the sulphur in the fuel used. Table VI gives this data showing the relationship, based on a number of heats.

As a means of combatting high sulphur fuel, Herty suggested using a slag with strong desulphurizing power—one that is very basic and very fluid. He further suggested the use of high manganese slags to obtain this fluidity.

In a paper presented in 1929, Herty⁷ gave additional data concerning the absorption of sulphur by steel scrap from the gas. These data, given in Table VII, show the amount of sulphur in the gas which is neutral to scrap of a certain sulphur content. The more the sulphur in the fuel differs from the values given in the table, the faster is the absorption from high-sulphur fuels or the more rapid is the loss of sulphur to the gases from low-sulphur fuels.

A. N. Diehl⁸ made a careful study of a large number of heats to determine the action of sulphur in the basic open hearth. He observed that when sulphur-free fuel such as natural gas

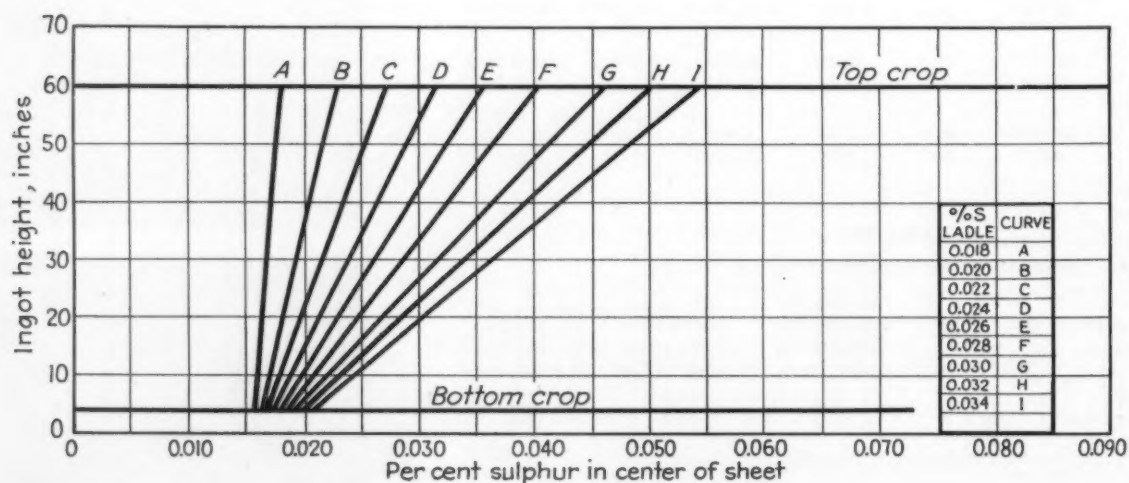


FIG. 15—Relationship between sulphur analysis at center of sheet and ingot height for various ladle analyses of sulphur.

was used, the sulphur in the finished steel was related to the sulphur in the pig iron charged. As a rule the sulphur content of the steel increased or decreased with the sulphur in the pig iron but the maxima and minima in the steel were not so pronounced as those in the iron. The scrap used had a balancing influence and tended to equalize the extremes in the pig iron used with a fixed lime charge. High-sulphur iron which was also low-silicon iron gave a more basic slag, and thus favored desulphurization.

Diehl found that a change in the sulphur content of the combustion gas was reflected in the sulphur content of the finished steel. It was demonstrated that the sulphur content of the finished steel was controlled by the sulphur in the coal from which the producer gas was made. When the sulphur in the coal was reduced by screening, the per cent sulphur in the steel responded.

High-sulphur and high-silica limestone contributed to the production of high-sulphur steel. The intensity of the effect was less when the pig iron was low in sulphur, greater when the pig iron was high in sulphur. However, the average of the heats observed indicated that an increase in sulphur of 0.005 per cent could be expected in the heats using high-sulphur limestone rather than very low sulphur limestone.

High residual manganese, high temperatures, and fluid slags were found to favor desulphurization of the charge. The best slag for desulphurization would naturally be one high in lime, low in silica, and low in iron oxide. Such a slag would not be suitable in the open hearth, however, as it must be fluid and have purifying action on the metal at open hearth temperatures.

A poor desulphurizing slag could be converted into a good desulphurizing slag by increasing its fluidity through the use of fluorspar. Similar results were obtained by using abnormally high manganese charges. These charges kept the residual manganese in the steel high, with a high per cent of manganese in the slag. The slag was low in iron oxide and very fluid, due to its manganese content, and for these reasons strongly desulphurizing. Diehl's work also showed the sulphur holding power of the slag was increased by increasing basicity, within certain limits of fluidity.

In a discussion of the paper Maxwell confirmed Diehl's conclusions regarding the effect of high sulphur pig iron on the analysis of the finished

TABLE V
Sulphur Content of Gas Over Bath and Corresponding Sulphur of Fuel Used^a

SO ₂ in Gas Over Bath, Volume Per Cent	Sulphur in Coal Weight Per Cent	Sulphur ^b in Producer Gas		Sulphur ^c in Tar or Oil, Weight Per Cent	Sulphur in CO Gas	
		Volume Per Cent	Grains Per 100 Cu. Ft.		Volume Per Cent	Grains Per 100 Cu. Ft.
0.00	0.0	0.00	0	0.0	0.0	0
0.01	0.15	0.02	12	0.15	0.063	37
0.02	0.29	0.04	24	0.31	0.13	75
0.03	0.44	0.06	35	0.46	0.19	112
0.04	0.59	0.08	47	0.61	0.26	150
0.05	0.74	0.10	59	0.76	0.32	187
0.06	0.88	0.12	71	0.92	0.38	224
0.07	1.03	0.14	82	1.07	0.45	262
0.08	1.18	0.16	94	1.22	0.51	299
0.09	1.33	0.18	106	1.38	0.57	336
0.10	1.47	0.20	118	1.53	0.63	373
0.11	1.62	0.22	130	1.68	0.70	410
0.12	1.77	0.24	141	1.83	0.76	448
0.13	1.91	0.26	153	1.99	0.83	485
0.14	2.06	0.28	185	2.14	0.89	522

^a Air for combustion is assumed.

^b The sulphur content of producer gas will vary somewhat for a given sulphur content of the coal due to variations in other constituents of the coal and to producer operations. The figures given for producer gas are based on coal containing 80 per cent carbon with 75 cu. ft. of gas produced per pound of coal and 10 per cent loss of sulphur in the producer ash and in the regenerators.

^c These two fuels give practically the same waste gas, and are considered together here.

TABLE VI
Effect of Sulphur in Gas-Producer Coal on Sulphur in the Finished Steel

Sulphur in Coal, Per cent	Sulphur in Steel, Per cent	Number of Heats
1.55	0.047	48
1.45	0.044	56
1.30	0.042	12
1.18	0.043	20
1.16	0.040	24
1.12	0.039	12
1.12	0.040	52
1.08	0.036	72

TABLE VII
Sulphur Content of Gas Neutral to Scrap of Certain Sulphur Content

Sulphur in Scrap, Per cent	Coal (for Producer Gas), Per cent Sulphur	Tar or Oil, per cent Sulphur	Coke-Oven Gas Sulphur, Gr. Per 100 Cu. Ft.
0.02	0.38	0.40	97
0.03	0.49	0.51	123
0.04	0.59	0.61	150
0.05	0.67	0.69	169
0.06	0.73	0.75	183
0.07	0.77	0.79	194

TABLE VIII
Relationship of Sulphur in Pig Iron to Sulphur in Steel

Number of Heats	Classification of Metal by Ranges of Sulphur Content, Per cent	Average Sulphur in Pig Iron, Per cent	Average Sulphur in Steel, Per cent
405	0.000 to 0.029	0.025	0.034
342	0.030 to 0.040	0.034	0.0338
51	0.040 to 0.050	0.043	0.0345
32	0.050 to 0.060	0.054	0.0367

steel. He gave the data shown in Table VIII to illustrate this fact, that an increase or decrease in the sulphur content of the pig iron will alter the sulphur in the steel in the same direction.

Data collected by Maxwell over a period of years indicated that the use of sulphurous fuels more than any other factor increased the sulphur in the steel.

In 1936, Maurer and Bischof⁹ reported the results of a study of desulphurization in the open hearth. Their results, while indicating not more than a trend, show that high temperatures, basic slags, and high residual manganese in the bath favor desulphurization.

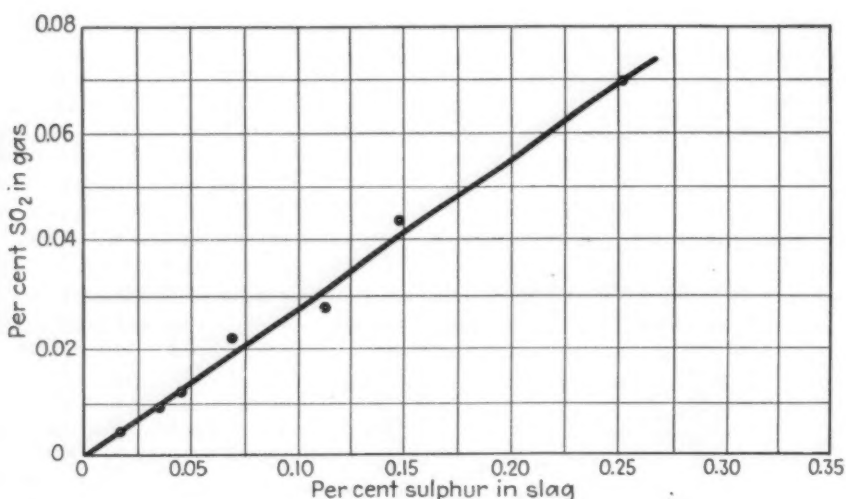


FIG. 16—Per cent sulphur dioxide in gas versus per cent sulphur in slag. (Herty)

With high temperatures, slag viscosities are lower and this in turn favors desulphurization. High residual manganese may indicate high manganese charges, or low iron oxide heats. High manganese charges favor high MnO content of the slag, thus giving a fluid and active slag. A low iron oxide slag, for a given carbon content, will usually indicate a hot heat, and the iron oxide being low favors desulphurization. They also found that basic slags are good desulphurizing slags.

Chipman,¹⁰ in discussing the effect of slag composition upon oxygen, carbon, and sulphur in the bath, states that the desulphurizing power of the

slag depends upon the composition, fluidity, temperature, and area of the bath, and the amount of action occurring. He gave a general curve showing a relationship between basicity of the slag and the ratio of sulphur in the slag to the sulphur in the bath.

Fundamentals of Desulphurization

The fundamental chemical reaction for the elimination of sulphur from the steel bath is usually expressed by the equation $\text{FeS} + \text{CaO} = \text{CaS} + \text{FeO}$. This reversible reaction is favored by very basic slags and retarded by the accumulation of calcium sulphide and iron oxide in the reaction zones. The degree of fluidity necessary for basic slags to be effective in desulphurization

to low fluidity, the reacting substances may not be brought together. It is necessary that the slag be sufficiently fluid to permit the movement of sulphur in the slag and bath and the free interchange between metal and slag.

The open hearth slag is the medium by which oxygen is brought to the bath. It must be necessarily oxidizing, and being oxidizing, the amount of sulphur eliminated is small. To compensate for its oxidizing character, open hearth slag must be strongly basic, hot, and fluid. It should also be pointed out that the saturation point of the slag for calcium sulphide must not be reached, or even approached, if rapid desulphurization is to be accomplished. To prevent saturation, the sulphur in the charge must be kept as low as possible, and the gas over the bath should also be as free of sulphur compounds as the type of fuel will allow. As soon as the slag is formed on the bath, sulphur is either picked up by the slag or oxidized from the slag into the gas, depending on the sulphur content of the slag and the SO₂ content of the gas. The equilibrium value of the sulphur in the slag has been determined to be 3.7 x per cent SO₂ in the gas.

As effective desulphurization depends upon the slag containing calcium sulphide considerably below its saturation value, the volume of slag is very important. As amounts of sulphur in the charge can be calculated and the sulphur pickup from the gas during melt-down is determinable, the minimum slag volume which will allow the sulphur in the steel to meet specifications can be determined. In practice, the open hearth departments are often pressed for increased production with existing equipment. Such pressure from the management usually results in the use of smaller charges of limestone, thus reducing the slag volume and shortening the time of melting. Smaller charges of limestone decrease slag basicity, decrease the iron oxide content for any given carbon content of the bath, necessitate higher temperatures and result in higher residual manganese in the bath. Although the low iron oxide and high temperature are favorable to desulphurization the sulphur in the bath usually increases under the above conditions as the slag becomes more nearly saturated with calcium sulphide.

Ed. Note:—Next week the authors will conclude this report with a discussion of factors affecting desulphurization of steel, chemical equilibrium of sulphur in the open hearth, etc.

⁹E. Maurer and W. Bischof: "Distribution of Sulphur Between Metal and Slag in the Basic and Acid Processes of Steel Manufacture," American Iron and Steel Institute, Vol. 133, No. 1, 1936, pp. 183-199.

¹⁰John Chipman: "Effect of Slag Composition Upon Oxygen, Carbon and Sulphur in the Bath," Twentieth Open Hearth Proceedings, A.I.M.E., 1937, pp. 110-113.

BUICK BALANCES ASSEMBLED ENGINE

SOME 30 different steps are taken to insure smooth running balance of the average eight-cylinder automobile engine, and the resulting balance is much more accurate than that usually found on any similarly complicated, yet inexpensive, piece of mechanism.

It is common practice in the industry, of course, to balance crankshafts, flywheels and clutches. This entails half a dozen operations. The crankshaft is not only balanced by itself but the crankshaft vibration dampener is also balanced separately. These two steps and the balancing of the flywheel are followed by careful balancing of the clutch pressure plate, cover assembly and the clutch driver plate. Then the pistons (eight for an eight-cylinder engine) are carefully weighted, adding eight more points to be watched in the balancing procedure. Similarly the eight connecting rod and cap assemblies and the eight piston and rod assemblies must be weighed. Roughly, this constitutes the 30 steps commonly taken in balancing an engine.

Balancing the complete engine *after* assembly is a new step in precision manufacture, adopted exclusively by Buick for 1940. The process eliminates entirely the effects of "stacking up" of production balance limits and assures an engine balanced completely to within a fraction of an oz.-in.

Despite the care taken in balancing rotating parts and sub-assemblies, probability and chance necessarily result in some of the engine assemblies having a large number of parts with maximum out-of-balance in such a way that the net result is a noticeable out-of-balance in the completed engine.

To locate and correct vibration caused by out-of-balance due to such a stacking up of production limits, engineers have devised a machine which is now being used to check all engines off the production line (the machine does not correct for vibration caused by faulty ignition, carburetion or other uneven firing).

The machine is composed of three major units: a bed for mounting the assembled engines and a 15-hp. electric motor; a vibration indicator which is

in principle a mechanical oscillograph; and an electrically driven drill mounted longitudinally on the test stand behind the engine flywheel to be used for correcting out-of-balance. (The machine actually is equipped with two vibration indicators for determination of fore and aft position of out-of-balance.)

The vibration indicator projects a beam of light on a screen—the light being reflected from a vibrating mirror to a rotating mirror and then focused on a translucent screen so an image of the vibration wave is shown. The indicator is mounted at the side of the test fixture so a pointer (vibration pick-up) rests against the engine being tested near the left rear motor mounting boss.

The indicator is driven by a synchronous motor which is connected to the larger motor used to drive the engine. In this manner the angle of light beam is synchronized in relation to flywheel rotation and flywheel degrees. Both the amplitude of the vibration wave and the flywheel degrees can be easily determined from the translucent screen on the indicator. In

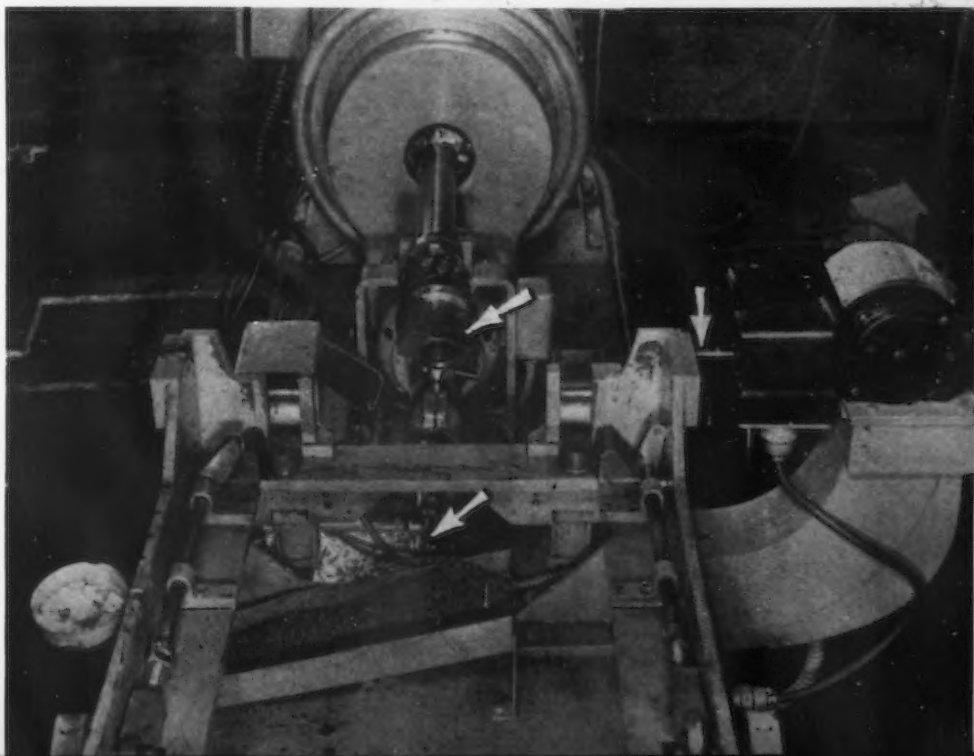
this manner the amount and location out-of-balance is quickly and accurately determined.

In operation, the engine is connected by a coupling to a driving motor and run at desired speeds by pressing a control button and adjusting a rheostat. The engine balance is indicated on the screen, with the amplitude of the vibration wave indicating the necessary depth of drilling to correct the balance. The angle at which the maximum out-of-balance occurs is also indicated.

The operator then stops the engine and rotates the crankshaft by turning a hand wheel on the power unit until the desired flywheel angle is set for drilling. The drill is fed into the flywheel by turning a hand wheel with a scale on the rim to indicate the depth of drilling. Accuracy of this operation is controlled by the skill of the operator in reading the vibration indicator and determining where and how deep to drill.

The balance, within $\frac{3}{8}$ oz.-in., is equivalent to the weight of a dime placed at the flywheel's rim where drilling occurred.

THE engine is mounted on the stand shown in the foreground. The drive coupling and drill used for removing excess weight from the flywheel are indicated with arrows. Also indicated is the vibration pick-up pointer resting against the engine bed at rear engine mounting location. The oscillograph screen is to the right of the pointer.



FINE WIRE FROM BUFFALO

By W. A. PHAIR

Associate Editor, *The Iron Age*

A STRAIGHT-LINE cleaning department, 5-min. lime baking unit, centralized soap solution source and 15 multi-pass benches drawing wire at up to 2200 ft. per min. are features of the new million-dollar fine wire mill of Wickwire Spencer Steel Co. at Buffalo.

ON the east shore of the Niagara River, two miles north of Buffalo, stand the two sentinel-like superstructures of the Harriet furnaces of the Wickwire Spencer Steel Co., suppliers of raw material to what is now one of the country's most modern wire mills.

To the east of the furnaces, away from the river, are clustered open hearth furnaces, and blooming, billet and rod mills. Southward of these

structures, but linked to them, are located the fence and wire galvanizing buildings and the original wire mill, now commonly referred to as the "old mill". Beyond this mill, pointing southward toward Buffalo, stands a new, modern building. This new structure, which boxes in close to 200,000 sq. ft. of floor space, is Wickwire's new million-dollar plant for producing steel wire and wire products. Included in this new addition are

sections for the manufacture of Isteg reinforcing bars. This latter product, comparatively new to the American market, is used extensively in Europe. It consists primarily of two steel bars twisted together to form a twin bar. By careful control of the twisting and the contracting, the ratio between yield point and ultimate strength is favorably altered.

This new wire mill is designed to take over the production of items previously turned out at the company's Goddard plant at Worcester, Mass., from rods rolled at the Buffalo mill, and consequently will be devoted primarily to producing the finer wire sizes. The heavier gages will be manufactured in the old mill, as in the past.

This shifting of production was caused primarily by the development of large wire markets to the west of Buffalo which meant that a large portion of the rods produced at Buffalo had to be shipped east to be processed and then shipped west again to consumers. The erection of the new Buffalo plant not only eliminates this duplication but also gives the company larger and more modern facilities for producing fine wire.

Some of the lighter work, heretofore carried on at the Goddard plant at Worcester has been transferred to the company's Clinton plant at Clinton, Mass., and to the Morgan works at Worcester. This work consists largely of specialty products where tonnage and shipping costs are not great. It is planned to eventually close down the Goddard plant completely.

Fifteen new multi-pass Vaughn machines capable of drawing from rods to 0.003 in. wire at speeds as high as 2200 ft. per min. form the bulk of the wire drawing equipment in the new mill. These 15 machines are divided roughly into three groups: One section reduces the rod to an intermediate size in the neighborhood of 0.072 in.; the next group continues the reduction to around 0.035 in. The third group consists of fine wire machines capable of drawing down to 0.003 in. This last group is composed of all wet machines, the other two



FIG. 2—A far cry from the grasshopper cranes and water boxes of yesteryear is this new straight-line cleaning and baking department. Rod bundles progress, via an inverted L crane, from acid tanks (rear) through rinse water, sulk racks and lime tubs to lightning-like baker visible in right-hand corner. Micrometer-like control and shorter processing time is possible with this modern setup.

FIG. 1—Roasting out the internal kinds is done in either the new electric unit (foreground) or in gas furnace (lower left-hand corner). The gas furnace swallows the production tonnages, while responsiveness of electric unit renders it ideal for special treatment and small lots.

o o o

groups being dry units. There is considerable overlapping of the noted ranges in actual practice, as the set-up was designed to give considerable flexibility.

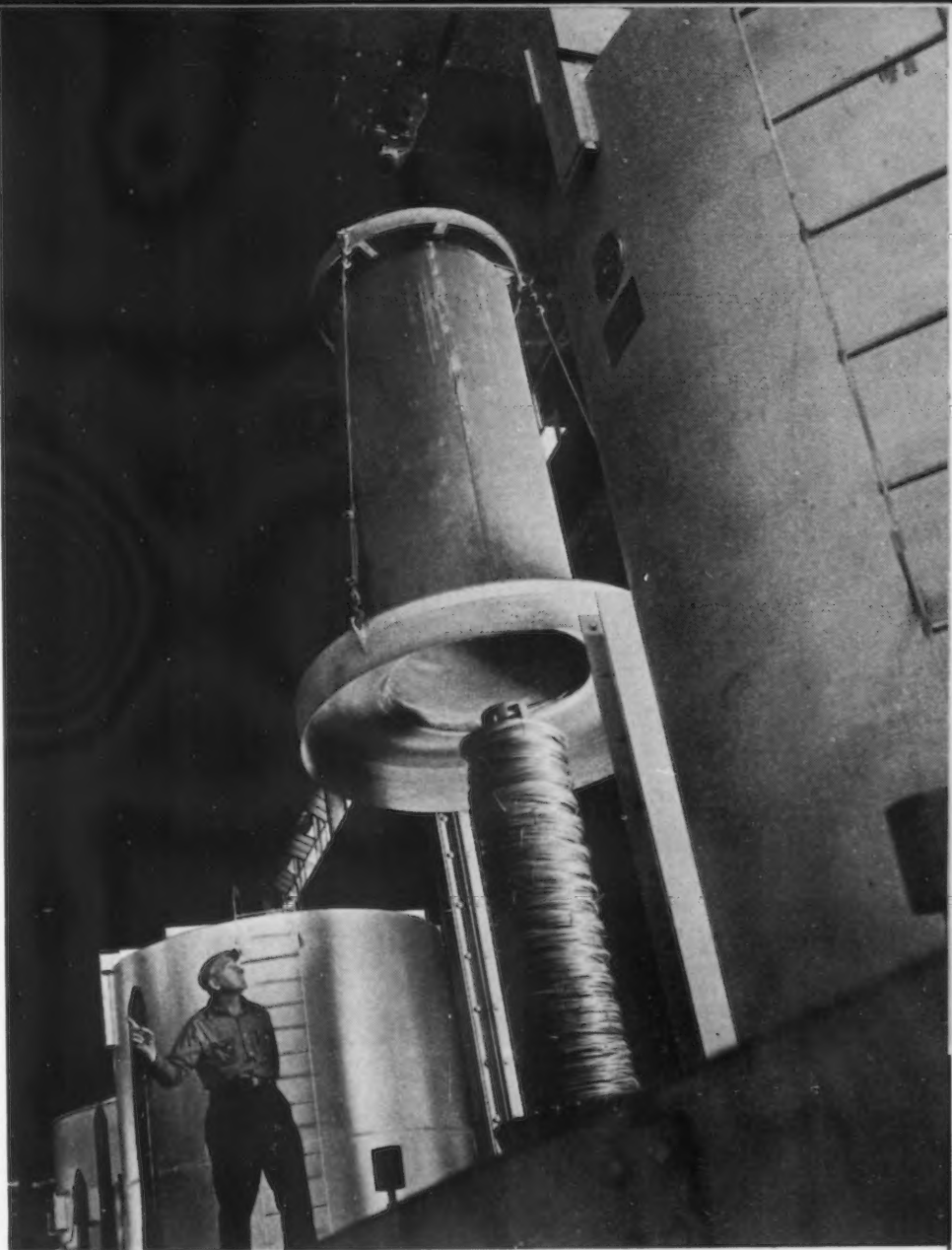
On the dry machines, the dies (tungsten carbide dies are standard throughout the new plant) are inserted in water cooled holders to reduce the heat of both the die and the wire. Take-up blocks also are water cooled.

A feature of the wet drawing machines is that the lubricant is provided from a centralized source, independent of the machine. Large tanks, holding several thousand gallons of soap solution, are located in the basement and the solution is pumped to the various die openings. The soap solution is kept constantly in motion and is automatically maintained at 140 deg. F. The centralized source of the lubricant makes possible very close control of the strength of the solution.

All the equipment discussed thus far is of the continuous type wherein the wire is drawn through multiple dies. To facilitate this operation and to avoid rethreading at the completion of each rod bundle, automatic welders, manufactured by Micro Products Co., are located at the entering end of each group of machines to join the ends of the bundles. The machines are also equipped with roll pointers and automatic power cut-offs to insure safe operation. These power cut-offs also stop the machines as the end of the bundle is approached to permit welding the leading end of the next bundle to the trailing end of the bundle on the machine. All wiring for the machines is run beneath the floor.

Some of the older drawing equipment from the Goddard plant was moved to the new plant to provide facilities for absorbing peak tonnages and special work.

Distributed throughout the mill are various tempering, coppering and tinning layouts, as well as equipment for single and double lead patenting on finer sizes. While much of this equipment was installed some time ago, it is completely equipped with automatic temperature control and otherwise modernized to give maximum quality and efficiency of operation.



While the term "old mill" is employed to differentiate between the new unit and the older plant, it is misleading as a description of the present equipment in the original plant, for part of the plant improvement program discussed here involved the improvement of processing equipment already in operation at the older plant and the installation of some new equipment. One such improvement was the installation of a new straight-line cleaning lay-out engineered to concentrate high capacity in small space and give sufficient flexibility to handle all the various types and sizes of material turned out by the plant. The component parts of this lay-out are arranged in the usual sequence; acid tanks, water wash, sulk racks, lime tubs and baker. Coils are passed through the various stages of the operation on a yoke capable of carrying 3000 lb. An overhead crane moves the yoke and services the entire length of the cleaning line.

Probably the most outstanding part of this layout is the baker. This flash-baking unit, developed by the Morrison Engineering Co., completely bakes the lime-coated coils in 5 min. (low carbon steel; high carbon wire requires 10 min.). The actual baking is accomplished by forcing air heated to 500 deg. F. against the rod or wire surface at high velocities.

Still another important improvement to the older mill is the new annealing department. In place of the old, pot-type furnaces wherein the wire to be annealed was placed in cast iron pots (which often weighed half as much as the charge itself) the new furnaces are equipped with heating bells which are placed over the charge as it stands upright on the base. In place of the usual iron pot, a heat-resisting inner cover is used to protect the wire from direct heat. As the cover is handled separately from the load, it is of thin gage, thus reducing the weight of metal going through the



AT LEFT

FIG. 3—Heart of cleaning line is this Morrison Flash-Baker. Forced circulation of air at 500 deg. F. dries bundles in 5 to 10 minutes as against six to eight hours demanded by usual dry house equipment. Little usable heat escapes from baking chamber.

o o o

BELOW

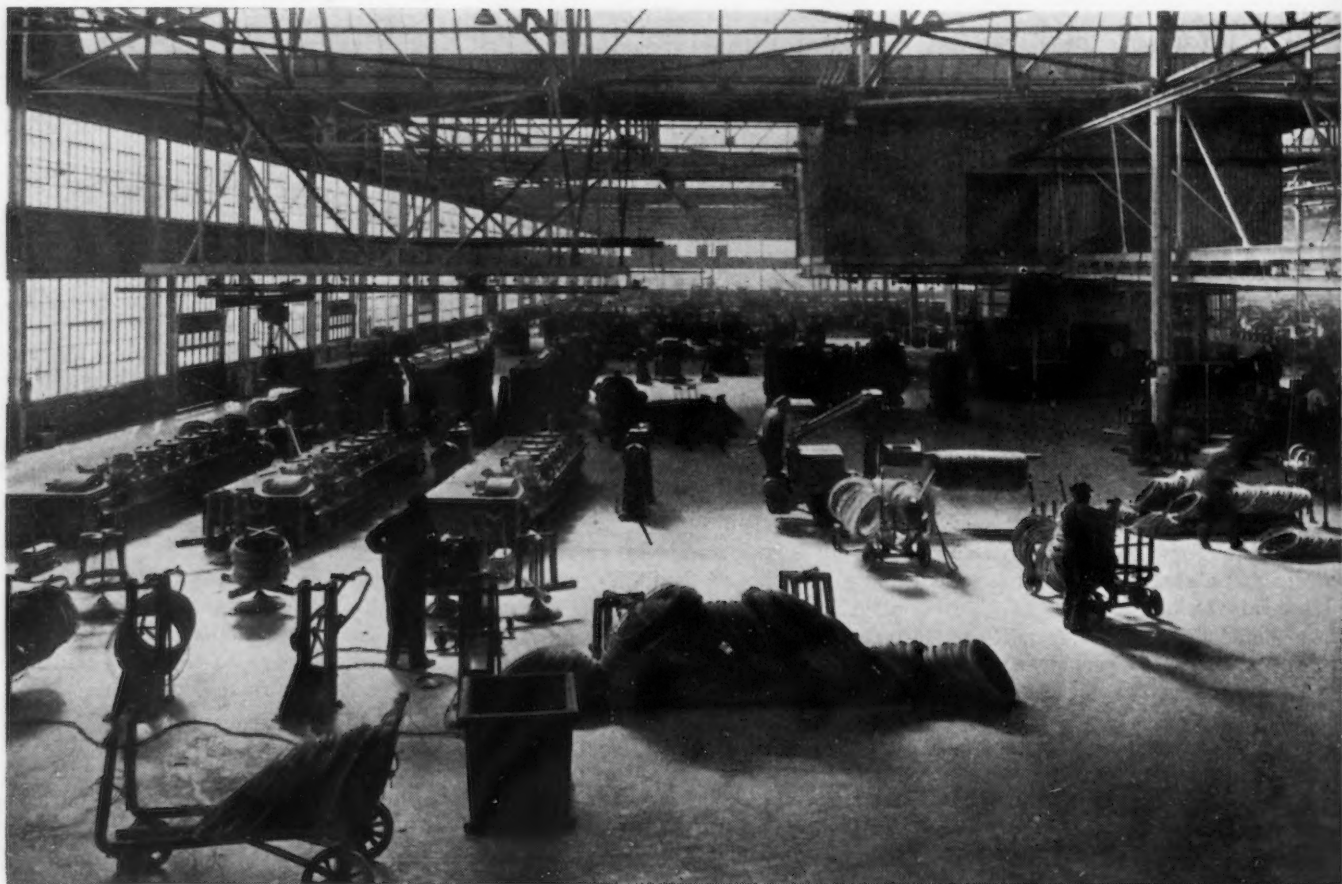
FIG. 4—New, high-speed dry drawing frames can be seen to the left in this general view of Wickwire's new "day-light" plant. Loop frame between bundles and benches automatically cuts off power in event of snarls. Equipment brought from Goddard plant is shown at right center. Employee's washrooms are visible suspended from roof.

thermal cycle. There are four bases to each unit, all equipped with fans which circulate the atmosphere inside the inner cover, thus providing maximum heat distribution. In practice, when one base is being used to heat a charge, another can be used for cooling while the other two are being loaded.

One annealing unit (four bases, heating bell and cooling bell) is heated by electricity, while the other is gas-fired. Both, however, follow the same general construction lines. The capacity of the electric unit, a product of General Electric Co., is around 20,000 lb. per day and is used primarily for special charges and small lots. The gas-fired unit, manufactured by Lee Wilson Engineering Co., takes care of 30,000 lb. per day and is utilized to treat tonnage lots.

Both units are equipped with G-E equipment for producing and controlling the atmosphere gas. When using controlled atmosphere, a partially burned gas is circulated around the stock prior to and during heating and during cooling to purge the atmosphere inside the inner bell of oxygen. The result is a bright final product.

Going beyond the actual manufacture of the wire, considerable effort was devoted to developing a modern shipping and bundling room to com-



AT RIGHT

FIG. 6—Fresh wire Refrigerator cars are used extensively at the Buffalo plant to overcome hazard of oxidation in wire shipments which may pass through areas of varying temperature and humidity characteristics.

o o o

BELOW

FIG. 5—Close-up of new Vaughn continuous, multi-pass drawing bench. This machine is used to reduce rod stock to around 0.072 in. in six drafts. Dies are all tungsten carbide for longer life and greater accuracy and are water cooled. Roll pointer is at right center.



plement the new wire drawing equipment. The shipping room, acting as a corridor between the old and the new plants, is 80 ft. wide and 400 ft. long, and is serviced by a 20-ton overhead crane and a fleet of rubber-tired industrial electric trucks. The railroad siding, with a capacity of 10 cars, runs into the shipping room. The tracks are located below the surface of the loading platform to a depth that brings the floor of the freight cars level with the floor of the loading platform. A unique aspect of the shipping of wire from this plant is the extensive use of refrigerator cars. This is not done to keep the wire cool, but to guard against sudden changes in temperature during transit which might cause condensation of moisture on the wire and subsequent rusting.

The human element, still an important constituent of good wire, has not been overlooked. Suspended from the structural members of the roof, away from the dust of the operating floor, are five modern washrooms.

The addition of the new unit and the improvements to the old plant establishes the Buffalo mill as one of the most modern and complete wire drawing plants in the country with centralized facilities from the unloading of the ore to the final distribution of the finished wire.



INSIDE SURFACES INDUCTION HARDENED

A VARIATION of the well-known method of heat treating metals by electrical induction, which makes possible the hardening of inside diameters of cylinders and other bores, has been developed by Budd Induction Heating, Inc., a new subsidiary of the Budd Wheel Co.

The process, for some time utilized in production work at the Budd Detroit plant, makes possible the heat treatment of inside diameters of metal cylinders from 2 in. in diameter up, and in lengths limited only by the design of suitable equipment.

The area treated, depth of treatment, and the degree of hardness developed are controlled within exceedingly close limits, it is claimed, while timing of the operation is a matter of seconds.

In hardening inside diameters in which the treated area is of considerable length, such as engine cylinders, a retracting type head, which heats the material by electrical induction, is used. This is drawn evenly through the cylinder, followed by a water quench.

On one of the machines now in regular operation, a "one-shot" type of head is used to harden the bore of automobile hub forgings, thus making the roller-bearing race an integral part of the hub. In this application, the treated area is brought to a hardness of Rc 58-64.

Other practical applications where it can be used to advantage, according to company engineers, are the cylinder bores of diesel, gasoline and steam engines, oil-well casings, and the inside diameters of sleeves used in sleeve-valve internal combustion engines. Many other applications are under consideration at the present time.

AN automobile hub in place in the induction heat treat machine, just after completion of the hardening operation. The head of the machine has been lowered into the barrel of the hub, bringing the bore surface to a high temperature, and then withdrawn as water is forced at high pressure through the quenching fixture to complete the hardening operation.



While present equipment is applicable to diameters of from 2 to 7½ in. and lengths up to 30 in., treatment of an even wider range of sizes is in prospect.

An important feature of the process, Budd engineers declare, is the fact that the outside diameter, and all other unhardened areas, can be machined after heat treatment of the inside diameter of the bore. As the depth of the hardened area is accurately controlled, the area which can be machined after the bore has been hardened can be very precisely determined. Sections of the bores which need hardness can be accurately treated to produce this quality, leaving tough machineable metal in all other parts of the hub, cylinder, sleeve, or other part under treatment. Further local heat treatment is also possible after machining.

Because of the short heat cycle employed, the whole hardening operation is performed in 1 to 3 sec. and decarbonization is no longer a problem. It does not occur.

The short cycle, in combination with an almost instantaneous quench which follows, reduces oxidation to a minimum, while oxidation can be entirely

eliminated when special provision is made to prevent it.

Results of repeated tests, plus the experience gained in producing nearly 2,000,000 automobile hubs with interior diameters treated by the new process, have led to a number of interesting conclusions. Control of area, depth, and degree of hardness obtained is extremely accurate. Beyond this, a control system which operates automatically insures uniformity of hardness throughout the treated area, uniformity of area treated, and uniform depth of areas hardened. Depth of the area hardened can be varied from 0.030 in. to 0.125 in. or more.

Because of the high speed of heating, and the fact that only the area and depth to be hardened are subjected to heat treatment, distortion is held to a minimum. Annealing or normalizing treatments are seldom required.

The new machines are designed for rapid changeover from one size of bore operation to another. Flexibility, as well as accuracy of control, has been built into the equipment thus making possible efficient production of different size units without time-consuming changeovers, and with the operation of a minimum number of production lines.

WHAT'S NEW IN SMALL TOOLS, CUTTERS, GAGES AND DRAFTING EQUIPMENT

By FRANK J. OLIVER
Associate Editor, The Iron Age

ACCESSORY equipment for the machine shop illustrated in this compilation of recent announcements of the manufacturers includes cutters and cutter holders, clamps and vises, hydraulic pumps, portable power tools, inspector's hammers and various types of measuring

equipment for checking linear dimensions, parallelism of faces of micrometers, contours of balls, and strength of specimens. Two new types of drafting machines have been placed on the market, as well as two new models of blue-printing machines.

ing the operator a clear view of the work. Chucks or parts may be had separately or a complete set of Morse taper chucks, with collets covering from $\frac{1}{2}$ in. down to No. 80 drill size, can be supplied in a substantial lock-box.

Micro-Nut for Adjustable Adapters

END-CUTTING tools can be quickly and accurately set to their correct length, or in the example of multiple spindles, in proper relation to each other by means of an adjustable micro-nut recently developed by the *Gairing Tool Co.*, Detroit. Adjustments ranging from 0.001 to 0.020 in. can be made by turning a sleeve that works independently of the adapter screw. Should a greater amount of adjustment be desired, an Allen set screw is loosened in the micro-nut and the whole assembly turned on the adapter sleeve. One complete turn equals 0.083 in. These micro-nuts can be used in connection with any standard adapter assembly or with tool holders and boring bars. They are made in all standard sizes.

Toggle Clamps

IMPROVED design, simpler installation, wider range of clamping and adjustment and greater operating convenience are claimed for the new line of Danly Kwik-Klamp toggle clamps, made by *Danly Machine Specialties, Inc.*, 2130 South 52nd Avenue, Chicago. All members revolve as a unit around the center pin in semi-circular base, and any angle or compound

SCREW threads from No. 0 up to $\frac{3}{8}$ in. can be produced to the exact fit desired with a new type of solid adjustable die head, introduced by the *Geometric Tool Co.*, New Haven, Conn. The EJ5 Geometric die head has four small chasers that are adjustable within the die, allowing the production of the exact decimal fit desired. The tool is only 1 in. in diameter and weighs 5 oz. complete. To facilitate removal of the high speed steel chasers for regrinding, the faceplate is equipped with a bayonet type lock. The chasers overhang so that shoulder threading is possible.

Another feature of this small die head is that it has a non-releasing floating shank, with enough forward float available so that fine pitch threads can be produced without the use of accurate camming. In fact, the tool can be set up on a B & S automatic cammed for some of the usual types of solid dies with holders without the necessity of changing cams. No holder is necessary. As many as 100,000

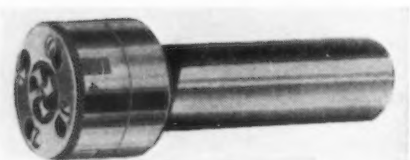
pieces have been threaded with this die head between grinds.

Precision Collet Chuck

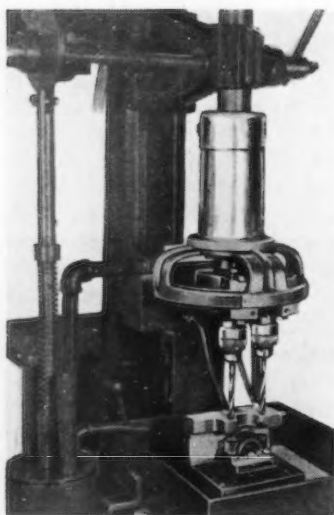
ALL working faces and the concentricity of holes, bearings, and angles are held to a tolerance of 0.0001 in. on a new collet type precision chuck for drills and end mills, announced by the *Erickson Steel Co.*, East 80th Street and Bessemer Avenue, Cleveland. The chuck consists of four parts—shank, shank grip nut, collet and nosepiece. The collet is unusually collapsible and provides an eight point grip in place of the usual three to four. Since the collet grips equally well on flutes or shanks, broken drills or mills can be used without loss of accuracy. The chuck shank has a deep hole, permitting a drill to be set far enough back to prevent vibration and minimize breakage even when heavy feeds and high speeds are used. The hardened nosepiece is of small diameter to permit working close up to flanges and in grooves, besides giv-



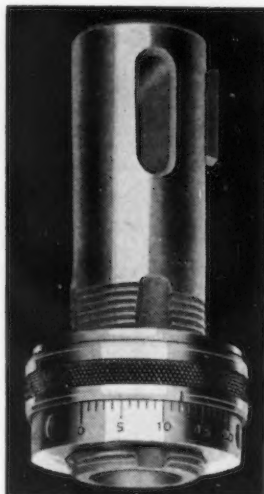
UNUSUAL grip and ease and accuracy of set-up are claimed for this collet type precision chuck for drills and end-mills, made by Erickson Steel Co. The collet is inserted in the shank and the nose piece tightened down upon it by means of the shank grip nut, thus avoiding the possibility of twisting the collet during the process.



STYLE EJ5 Geometric solid adjustable die head is built in one size only with a threading range from Nos. 0 to 10, in threads up to 100 per inch. The adjustable feature allows any class of fit to be produced from a single set of chasers of a given size.



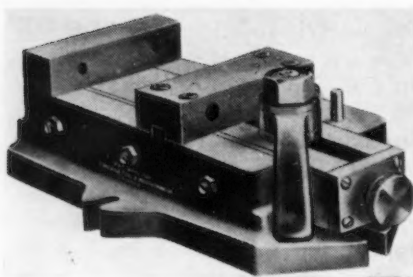
LMCO Quick-Set two spindle adjustable drill head is made in two sizes by the Linderme Machine & Tool Co., Inc., 12259 Coyle Avenue, Detroit. Type A has a center distance adjustment from 1/4 to 6 in. and accommodates drills from 1/16 up to 1/2 in. in soft metals. Type B, shown, has a center distance adjustment from 1 1/8 to 4 1/2 in. and accommodates drills from 1/16 to 3/8 in. in soft metal. Center distances may be varied by loosening two nuts. The type B is especially suitable for small drill presses such as the light type Canedy Otto.



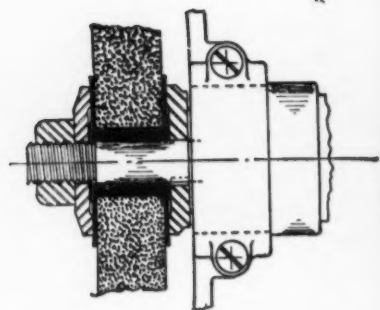
GAIRING Micro-Nuts can be used with any standard adapter assembly or with tool holders and boring bars so as to give an accurate depth adjustment from 0.001 to 0.020 in.



DDOUBLE the life is obtained from the new Go & Go heavy duty slab mill blades by having a right-hand spiral cutting edge on one side and a left-hand spiral on the other. When the grinding life of the first side is utilized, the same blade can be turned over and used in a body of opposite spiral. Slab cutters are usually made of herring-bone type with equal numbers of sections of each hand of spiral so that blades may be transferred from right to left hand and vice-versa. Blade anchorage is effected by serrations on one side and on the other by a taper dovetail wedge which is tapered lengthwise and also into the body so that it cannot possibly become loosened. The cutter body is made from heat-treated alloy steel and the holes are chrome plated to resist wear and scoring. The blades, which are made in 4 in. wide sections, are flat and are milled on a true helix to insure a constant undercut throughout the entire length. Cutter diameters range from 8 1/2 to 11 in. This is a product of Goddard & Goddard Co., Inc., Detroit.



FOR high production milling, drilling and grinding operations, the Chicago Tool & Engineering Co., 8389 S. Chicago Avenue, Chicago, is offering the 2 1/2-in. Palmgren production vise shown. Quick loading and unloading is effected by an adjustable cam locking lever which works against a hardened steel surface. Where a change of size of parts is to be made, a hand screw adjustment is used. The vise is not equipped with jaws as the shape is usually determined by the work at hand.



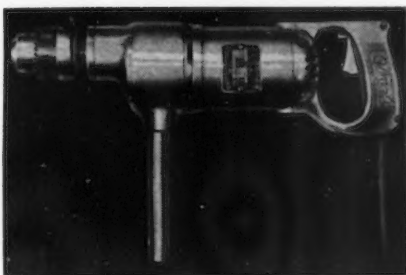
A RESILIENT mounting for portable grinders, known as the vibration dampener bushing, is being incorporated in grinding wheels made by the Manhattan Rubber Mfg. Division, Passaic, N. J. Tests made by the manufacturer indicate that the use of the V. D. B. mounting increases grinding wheel life, reduces machine maintenance costs and gives a better grinding finish. It is also claimed that the mounting gives increased operator efficiency, with less fatigue.



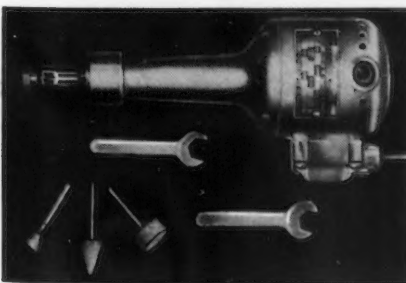
HEAVERY duty Danly Kwik-Klamp with fixed base. A straight type of fixed base is offered as well as a swivel base in the heavy duty type. A smaller, light duty toggle clamp is furnished in fixed base only.



HERRINGBONE gears, hydraulically and mechanically balanced; needle bearings on both shafts; ground joints without gaskets, and a double, self-balancing mechanical seal on the drive shaft are the outstanding features of the new 500 series Brown & Sharpe rotary geared pumps, offered in six sizes with output capacity of 5 to 37 gal. per min. Maximum pressure is 500 lb. per sq. in. Gears are made of heat treated steel, separate from the shafts. The pumps are sold in the United States only, either with or without the foot mounting.



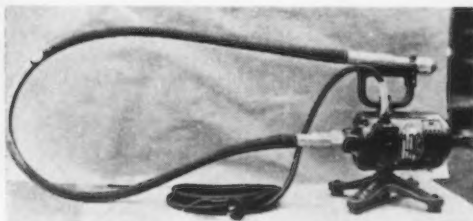
FRAME, gear plate and gear head are cast of aluminum alloy in the new Clark type UB8-3 1/2-in. utility electric drill. Ball bearings are used throughout. Universal motor is cooled by an oversize fan with improved slotted air ducts. No-load speed is 650 r.p.m. and net weight is 9 1/2 lb. Made by Jas. Clark, Jr. Electric Co., Louisville, Ky.



REPLACEABLE cartridge fuses protect this Clark high speed, ball bearing die grinder against overload after a time delay of about 1 min. The hardened armature shaft rotates on selected ball bearings for precision work. Air holes are placed to give straight flow ventilation to motor frame and head. No-load speed of universal motor is 20,000 r.p.m. Net weight is 4 1/2 lb.



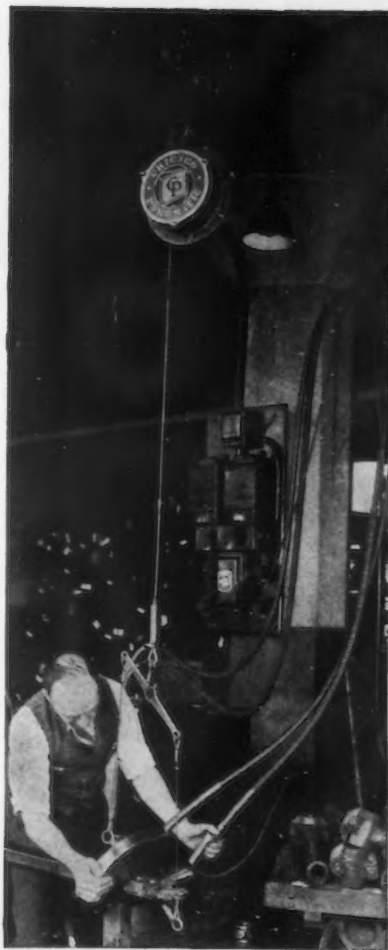
THE new Thor Bantam pneumatic grinder is only 5 1/2 in. long and weighs 18 oz. Operating at a free speed of 14,000 r.p.m., it is suitable for use with a wide variety of abrasive wheels and shapes from the smallest pointed wheel up to 1 1/2 in. diameter round wheels. Other accessories such as rotary files, sanding disks, wire brushes and saw blades can also be used on this tool, which is another product of the Independent Pneumatic Tool Co., Chicago. Air consumption is said to be low. Standard equipment includes a push button throttle, 1/4 in. collet and swivel hose connection. Lever throttle is optional.



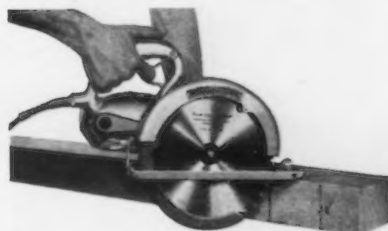
THIS 3/4-hp. flexible shaft die sinking machine is driven by a universal motor at 18,000 r.p.m. It is made by the Mall Tool Co., 7740 S. Chicago Avenue, Chicago.



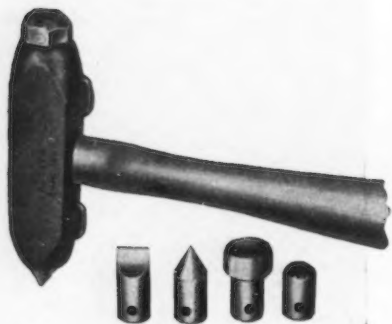
THIS saw frame, made by the Stanley Electric Tool Division, New Britain, Conn., is used with Stanley safety saws Nos. W7, W8 and W9 for square, bevel and bevel miter cuts. Many pieces may be cut to exact size without having to lay out and mark each piece separately. The No. 158 frame is made of structural steel and is adjustable for height by moving clamp nuts on each end of frame. For any other angle than straight cuts, a stop pin in front drops into bored holes in the bench.



FOOLPROOF, retainer inclosed spring that can be replaced in 3 min. is one of the features of the line of Super Safety balancers for portable tools recently introduced by the Chicago Pneumatic Tool Co., 6 East 44th Street, New York. Outside mounting permits largest possible diameter spring in any given balancer capacity, which runs from 10 to 200 lb. maximum. An automatic safety lock prevents dropping the load and shock is prevented from reaching the indexing gear by cushioning the latch against rubber. A single cable is used, guided in line with drum groove to prevent jumping.



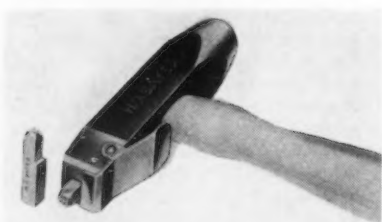
WAPPAT model A-9 portable electric handsaw can be equipped with abrasive disks for cutting material other than lumber. Saw has a 9 1/2 in. diameter blade and a maximum cutting capacity of 3 1/4 in. Unit weighs 21 lb. and is well balanced for single hand operation. A telescoping guard is used and a blower keeps the cutting line visible. There is a graduated quadrant for bevel adjustments. Made by Fred Wappat, 7319 Penn Avenue, Pittsburgh.



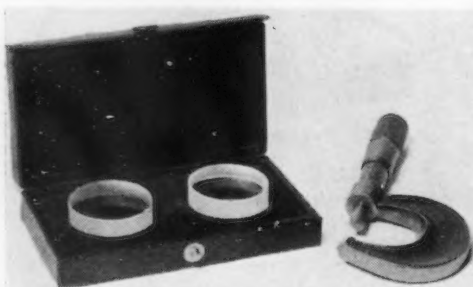
INTERCHANGEABLE plugs make it possible to use this Cunningham inspector's hammer with a company insignia on one end and a chisel or prick on the other for detecting blowholes in castings and the like. Hammer and plugs are made of a non-spalling safety steel.



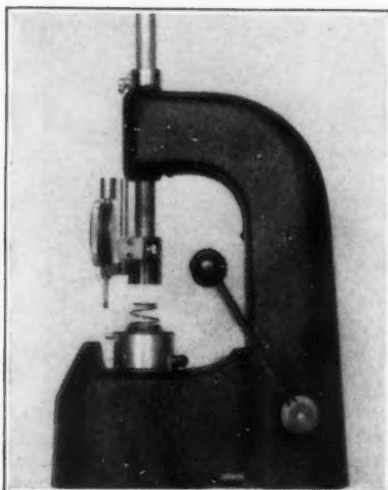
TYPE is held in this new Matthews type RR-1 inspector's hammer by means of a rubber retaining ring located inside the knurled segment which screws onto the end of the hammer, thus greatly simplifying the changing of type.



A SPRING clip holds the type in position in the new Hercules inspector's hammer introduced by H. O. Bates.



SET of Van Keuren optical parallels for checking the flatness and parallelism of faces of micrometers by means of light interference bands. Each band represents an error of 0.00001 in. from the high contact point.

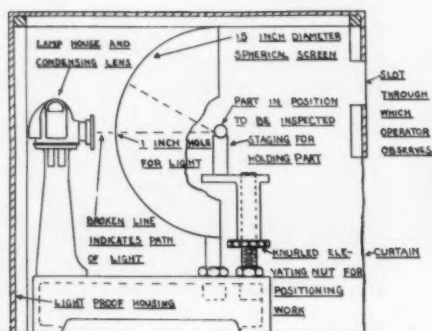


MODEL PB3 Link compression spring tester is made in 10, 50 and 250 lb. capacities, with weighing dials graduated in 1/2, 2 and 8 oz., respectively. Six inch vertical height scale is graduated to 1/32 in. for indication of compressed height. The dial indicator is adapted to the checking of springs with close height tolerance. For quantity production checking, an electric signal device is available that operates when a preset height stylus makes contact. Smallest machine accommodates springs up to 1 5/8 in. diameter; the other two sizes, 2 5/8 in. Equipped with precision ball bearings throughout. Made by Link Engineering & Mfg. Co., 1054 W. Baltimore Avenue, Detroit.

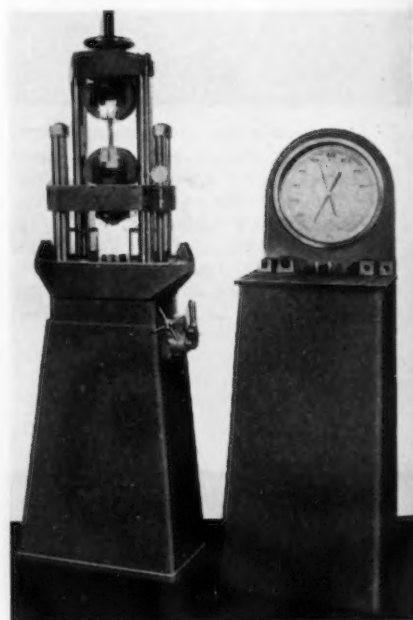


DEVELOPED originally for examining the inside portions of a valve and valve seat, the Pike-O-Scope illuminated magnifier can also be used for visual inspection of other types of machinery. A set of achromatic triple lenses are lighted by a special lamp built into the bottom of a cylinder which also serves as a handle. Defects can readily be seen at a distance of 2 ft. from the eye. Lamp cylinder and threaded ring for the lenses are made of a heavy shock resistant bakelite, molded by the Boonton Molding Co. The instrument is made and sold by E. W. Pike & Co., Elizabeth, N. J.

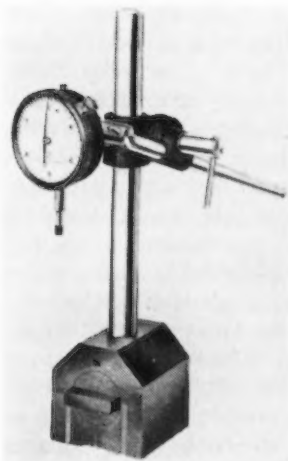
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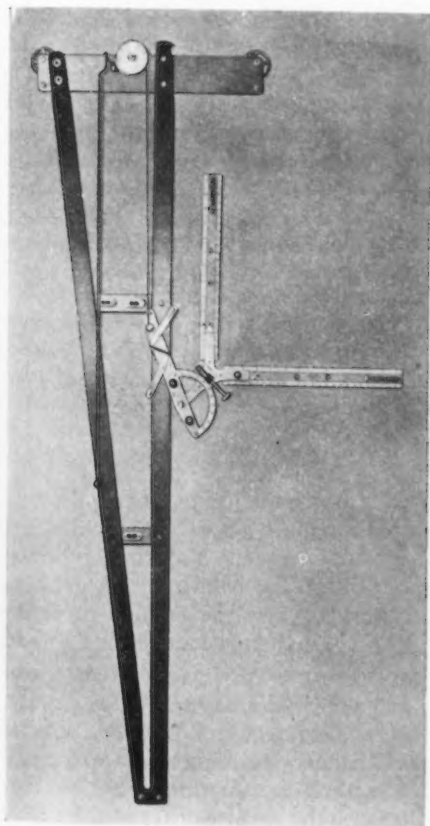
SPHERICAL surfaces such as balls used in precision ball bearings can be inspected for flaws by relatively unskilled operators on this special comparator, built by the Jones & Lamson Machine Co., Springfield, Vt. An enlarged image of the surface being inspected is projected onto a concave hemispherical screen, 15 in. at its maximum diameter. Magnification depends upon the diameter of the work, a 1/4-in. ball being magnified 60 times. Spheres up to 1 1/2 in. diameter may be examined.



UNIVERSAL testing machine for tensile, transverse and compression testing on all A.S.T.M. standard specimens. Capacity is 60,000 lb. The load is applied hydraulically and the rate of loading is automatically maintained by an auxiliary valve. Ram travel is 4 in. When tensile testing, the transverse table, posts, and head are full floating, eliminating any possibility of misalignment of specimen or friction in the ram. For transverse or compression testing, the floating unit is guided in a rigid but frictionless manner. Made by the Detroit Testing Machine Co., 5137 Trumbull Avenue, Detroit.

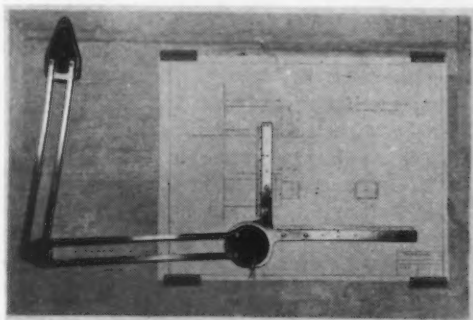


PERMANENT magnet in the base enables this Brown & Sharpe dial test indicator to be held in any position, including upside down or to a small surface that would not support a regular indicator base. Operating on the same principle of the permanent magnetic chucks introduced by B & S, the base may be released by turning the control to the "off" position. No. 744 has spindle movement of 0.3 in. by 0.0005 in.; No. 744A has movement of 0.02 in. by 0.0001 in. Offered for sale only in the United States.



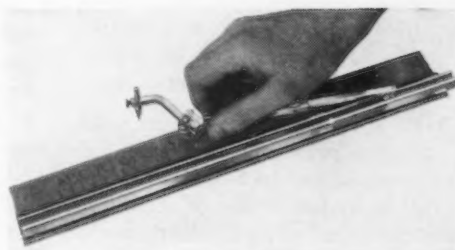
THE New Emmert stainless steel drafting machine comprises a vertical T-square combined with a vertically slideable protractor carrying interchangeable scales and guided by a track. Eighteen sizes are made, to cover drawings from 24 x 36 in. up to 132 in. wide by any length of board for full scale work.

MODEL D-520 Wriggraph Drafter is equipped with an adjustable type of ball bearing, said to increase the life of the machine five times over that of previous models. Machine will make 20 x 36 in. drawings or smaller, and is furnished with a "tack on" mounting plate so that it can be instantly fastened to any flat wooden surface in any position. The protractor is of the 1-deg. indicating type. Engine divided scales with transparent edge are furnished in all standard graduations. The unit can be knocked down and carried in a brief case. This is a product of L. G. Wright, Inc., 5209 Euclid Avenue, Cleveland.

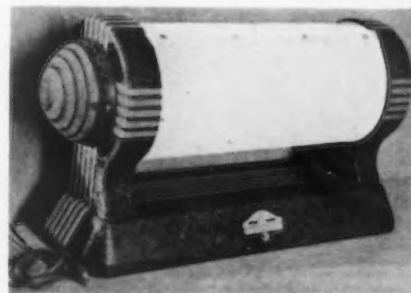


EDCO Spee-Dee lettering set makes it possible to produce eight different types of lettering simply by changing the setting of the tracer and pen arm. Each lettering outfit has six weights of pen points from extra light to extra bold. Each guide has upper and lower case letters, numerals and characters. Letters are formed in one continuous movement without shifting the guide, which is made of durable plastic material.

This device is made by the Eugene Dietzgen Co., Chicago, Ill.



TWO No. 2 photo-flood light bulbs mounted horizontally are used as the light source in this Minute Man portable blueprint machine, announced by the Paramount Engineering Co., 5707 W. Lake Street, Chicago. Blueprint paper and tracing are wrapped around a cylinder 8 in. in diameter by 19 in. long and are held tight against it by a preshrunk cover. The machine will make blueprints or direct process prints in 1 min. or less, according to the maker. Machine is controlled automatically by an electric timer.



SHORTLY to be placed on the market by the Charles Bruning Co., 100 Reade Street, New York, is a blueprinting machine in which a high pressure mercury quartz lamp replaces the conventional carbon arc as a light source. This lamp, which should not be confused with the ordinary low pressure mercury tube, is made by the Hanovia Chemical & Mfg. Co. and is guaranteed a life of at least 1000 hr. without appreciable diminution of light output. The new lamp is said to give uniform distribution of light to the entire printing surface without flickering and with only one-third the current consumption of a carbon arc of equal capacity. A number of mechanical improvements have also been incorporated in the new machines to give improved feeding, speed control and elimination of tracing slippage and wear.



angle can be obtained at the point of clamping with clamps mounted directly on either flat or vertical faces of the die, jig or fixture. Operating handle can be adjusted through an angle of 150 deg. to clear overhanging panels or for operating convenience. With the base horizontal, the clamping bar is adjustable from the horizontal upward to 50 deg. and downward to 90 deg. The heavy duty type can also be had with a swivel base, permitting sideway adjustment of 75 deg. to right or left. These clamps are recommended by the maker for a variety of applications, including clamping production parts in all types of fixtures for drilling, boring, reaming, welding, secondary press operations and sub-assembly.

Inspector's Hammers

THE spread of Government work and the great number of inspections required on such work has led several manufacturers of marking equipment to introduce in recent weeks hammers for marking parts after inspection. All of them make provision for interchanging the type on one head, and the chief differences in design have to do with the means of holding the type. The three hammers pictured are made respectively by *M. E. Cunningham Co.*, 101 E. Carson Street, Pittsburgh; *Jas. H. Matthews & Co.*, 2942 Dorbe Street, Pittsburgh; and *H. O. Bates*, 251 N. Broad Street, Elizabeth, N. J. The last named firm is also marketing a hand stamp numbering machine for similar application. It can be had with numbers

running up to 999999. Made of shock resisting alloy steel, it has a minimum of parts.

For Checking Micrometers

A SET of optical parallels for checking the flatness and parallelism of faces of micrometers and measuring machines by the light wave interference method is offered by the *Van Keuren Co.*, 12 Copeland Street, Watertown, Mass. The set has two optical flats $1\frac{1}{4}$ in. in diameter and parallel within 5 millionths of an inch. One parallel is approximately 0.650 in. thick and the other about 0.6375 in., or 0.0125 in. less, the thicker one being used for checking the micrometer faces at a position corresponding to 0, the thinner a half turn away from the 0 position, giving a double check of parallelism.

If the micrometer faces are not parallel, contact on the glass parallel will be made at the two nearest points on the anvil and spindle face, and alternate bands of dark and light shade will appear, each corresponding to a variation of 0.00001 in. If the two faces are exactly parallel, one broad or continuous band will form across both faces. On new or relapped micrometer faces, the interference bands may be easily seen in diffused daylight. A monochromatic light may be required to show the bands on worn faces, however.

Drafting Machine

A DRAFTING machine has been developed by the *Emmert Mfg. Co.*, Waynesboro, Pa., in which the

principal parts are stainless steel. It is made up of a vertical T-square combined with a vertically slidable protractor carrying interchangeable scales, all suspended from a traveling head. The latter consists of a stainless steel plate provided with a set of four rollers that ride upon a straight stainless steel track fastened to the top of the drawing board in such a manner as to be adjustable both vertically and horizontally. One pair of rollers is beveled and runs on ball bearings, so arranged that the weight of the head holds the upper rollers against the track. The head carries a spring balanced drum upon which is wound a silk line which is attached to the protractor, acting to hold the latter against the T-square blade and counterbalancing its weight. Tension of the drum can be adjusted to suit the angle of the drafting board. The head can be locked to the track when required.

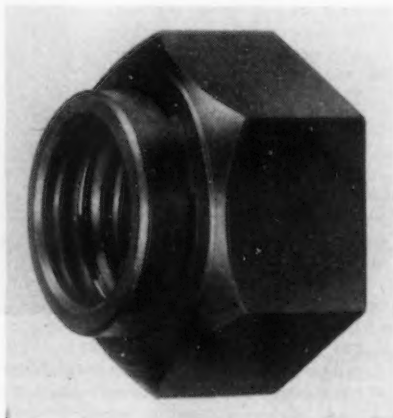
The protractor is provided with a worm that engages notches cut on the periphery of the protractor segment 3 deg. apart, thus making possible instantaneous setting of the protractor to any multiple of 3 deg. This feature is particularly useful in drawing pattern drafts, as well as in setting the commonly used angles of 30 and 45 deg. For finer adjustment, the neck of the worm has graduations of 36 divisions, each representing $1/12$ deg. Scales with all standard graduations are supplied for attaching to the protractor fork or arm, also special scales on order.

New Idea In Self-Locking Nut

IN the past several years, a number of designs of self-locking nuts and threads have appeared on the market as an answer to the problem of fastening where shock and vibration are present. Recently, the *Lamson & Sessions Co.*, Cleveland, has brought out a novel stay-on-safety nut, the locking action of which is automatic and positive and which does not depend upon special threads or other extra parts.

The locking portion of the nut (see accompanying illustration), consists of a raised crown section, slotted perpendicular to the axis of the nut. This section is distorted so as to form an elliptical ring section with the minor pitch diameter smaller than the bolt or screw pitch diameter on which it is

applied. The nut is double heat treated to give the crown a permanent set and a tough resilient spring characteristic



upon which the locking action depends. When applied on a bolt the crown is forced to assume the circular cross-section of the bolt, and this gripping action produces the friction necessary to prevent the nut moving on the bolt.

Because of the nature of the material used, it is said that the nut can be applied repeatedly without loss of locking action and without harming the bolt threads. Manufactured to conform to the American Institute of Bolt, Nut and Rivet Manufacturers' specification for semi-finished nuts, the nut can be applied to any standard thread bolt without special tools. Aside from steel, the nut can be made out of aluminum and its alloys, brass, bronze and stainless steel.

20,500 GRAIN BINS IN TWO MONTHS

WITHIN the past several months, the Department of Agriculture has ordered from Middle Western manufacturers more than 40,000 corn bins, at a cost of over \$6,000,000, for the storing of Government-owned surplus corn. These bins have required approximately 45,000 tons of galvanized sheets ranging from 14 to 24 gage.

The largest order received by any one company, for 20,500 bins, went to the Butler Mfg. Co. of Kansas City, and totaled \$3,284,305. The order, which was completed in less than two months, was greater than the 1938 output of the entire industry. In that short period Butler fabricated over 22,000 tons of galvanized sheets into 20,500 corn bins.

Though Butler was a leading manufacturer of grain bins before the Federal order was received, the plants did not have the facilities for turning out such a large number of bins in so short a time without disrupting other operations.

Since the Government inquiry, issued at the end of July, had called for completion of the contract 60 days after award, advance preparations were necessary even before the company knew whether its bid would be accepted. Optional arrangements were made for the leasing of a plant at Galesburg, Ill., and negotiations entered into with die and machinery makers, for equipment worth \$200,000, all these plans being made, of course, before any knowledge was had that the bid was to be successful. Butler being the low bidder, tool and die work was started before the contract was awarded, the machinery being obtained on an optional basis.

A total of 22 press brakes was divided among Verson Allsteel Press Co., Chicago; Cincinnati Shaper Co., Cincinnati; Dreis & Krump Mfg. Co., Chicago, and Cyril Bath & Co., Cleveland. Fourteen shears were purchased from Cincinnati Shaper, and Bertsch & Co., Cambridge City, Ind., while Johnson Machine & Press Co., Elkhart, Ind., supplied four punch presses. Dies were ordered from Chicago, St. Louis, Kansas City, Cincinnati and Minneapolis.

Lines to position the machinery were painted on the floor of the buildings. A wiring chart for power and light lines also was prepared and with-

in 10 days following the Government's acceptance of the bid, the plant at Galesburg was wired ready for operation.

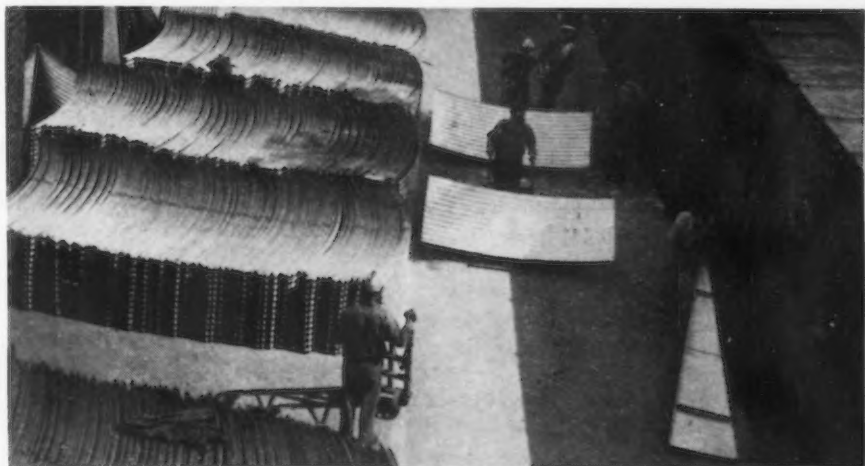
Within one day after receipt of the order on Aug. 10 a crew of six Butler men, including employment, production, engineering and management officials, were at Galesburg to begin operations. Forty-four men were hired Aug. 12, and hiring went on steadily to reach a peak employment of 718 men on Sept. 16.

Orders were put through the day the award was made, to Carnegie-Illinois Steel Corp. for nearly 15,000 tons of galvanized sheets, one of the largest individual orders for galvanized ever placed. Other orders went to American Rolling Mill Co., Sheffield Steel Co., Great Lakes Steel Corp., Bethlehem Steel Co., and Youngstown Sheet & Tube Co. Since these sheet orders were placed prior to the outbreak of war abroad, prompt deliveries had not yet become a serious problem. Several tieups at the plant were reported in

the final few weeks of the work, however, due to shortages of certain sizes. These delays proved not to be serious obstacles to the completion of the bins on schedule.

Most of the bins made by Butler required 2200 lb. of galvanized sheets, nearly every gage from 14 to 24 inclusive being used. Operations at Galesburg consisted mainly of shearing, punching and forming, a total of 342 fabricating operations being performed on each bin. Individual major parts numbered nearly 100, exclusive of bolts, clips, etc. The production schedule called for a completed bin every two minutes, throughout a 23-hr. daily working schedule, a day's output fluctuating between 600 and 800 bins.

The bins are shipped knocked-down complete with illustrated erection instructions, and average erection time for three unskilled men was 8 to 9 hr. The bins, knocked-down and erected, are shown in the two accompanying illustrations.



By C. E. WRIGHT
Managing Editor, The Iron Age

CANADA'S

ALTHOUGH Canada's area is greater than that of continental United States, its population is only about one-twelfth as large and its manufactured production is only about one-seventeenth of that of the United States.

These comparisons suggest the possibility of much more rapid industrialization in Canada in the future than has occurred in the recent past. However, since the World War the economy of the Dominion has changed from one in which agriculture dominated to one now dominated by mining and manufacture. The largest contributor to Canada's present total production is in non-ferrous metals.

Expansion of the iron and steel industry has proceeded less rapidly than the development of its mining properties. Among metal-working manufacturing groups the automobile industry has shown the greatest degree of growth.

Prior to the World War the production of pig iron (including ferroalloys) in the Dominion exceeded a million tons for the first time in 1913, when the output was 1,015,118 gross tons. This amount was exceeded only slightly in 1916, when 1,069,541 tons was produced, in 1917, with a total of 1,085,981 tons, and in 1918, when the war-time peak of 1,106,564 tons was reached. Since the World War the Canadian output of pig iron has only twice passed a million tons—in 1928 (1,082,960 tons) and in 1929 (1,159,606 tons). As of the end of 1938, the total pig iron producing capacity in Canada was rated at 1,555,000 tons. There are only 10 blast furnaces in the Dominion—seven in Ontario, with an annual capacity of 1,135,250 tons and three in Nova Scotia, with capacity of 419,750 tons.

Nor has steel production in Canada increased with any great degree of rapidity. The pre-World War peak of output of ingots and castings was 1,042,503 gross tons in 1913, while the all-time peak was 1,694,977 tons in 1918. Only a few times since the

(Photos by Courtesy of Who's Who in Canada)

World War has this war-time peak been closely approached, the best post-war records being 1,391,371 tons in 1929 and 1,352,345 tons in 1937.

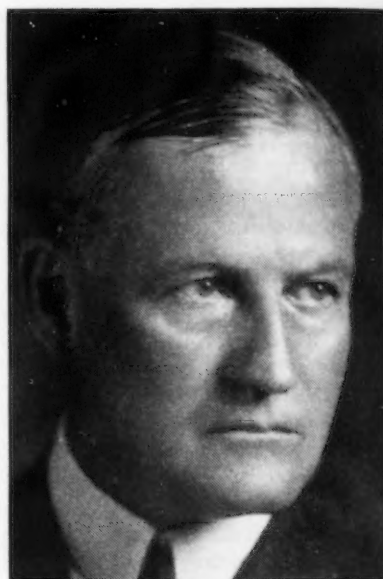
Present capacity in Canada for production of ingots and castings is 2,094,700 gross tons. Four companies own 90 per cent of this capacity: Steel Co. of Canada, Ltd., which has 681,000 tons (soon to be increased by the addition of a new 150-ton open-hearth furnace); Algoma Steel Corp., Ltd., which has 600,000 tons; the Dominion Steel & Coal Corp., Ltd. whose capacity is 425,000 tons, and the Dominion Foundries & Steel, Ltd., with 180,000 tons. Other primary producers, of which there are only six, and their capacities are: Atlas Steels, Ltd., 25,000 tons; Burlington Steel Co., Ltd., 22,000 tons; Canadian Car & Foundry Co., Ltd., 37,400 tons; Canadian Steel & Tube Products, Ltd., 60,000 tons; London Rolling Mills, Ltd., 9300 tons; Manitoba Rolling Mill Co., Ltd., 55,000 tons.

Of 1,060,029 gross tons of finished steel produced in Canada in 1937, the most recent year of high output, the major item was merchant bars, which accounted for 257,682 tons. Next was plates, sheets and strip (which are not totaled separately), amounting to 192,605 tons; then wire rods of 177,298 tons, rails, 77,588 tons, heavy structural shapes, 52,540 tons, light shapes, 39,949 tons, concrete bars, 37,374 tons. In the "all other" classification were included in that year 59,001 tons of wire and cut nails, 27,151 tons of splice bars, tie plates, etc., 83,118 tons of steel pipe.

Good Steel Customer of U. S.

In all times Canada has been one of the best steel customers of the United States, though in years of depression the Dominion mills supply most of the country's demand, as in 1933, when imports from the United States totaled only 99,806 tons. The best year of the recent period was 1937, when Canada took 456,599 tons of steel from the United States. That same year Canada was also a better steel customer of the United Kingdom than she had

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Chairman and president
Algoma Steel Corp.



A. CROSS
President Dominion Steel
& Coal Corp.

INDUSTRIALIZATION ♦ ♦ ♦

IRON AND STEEL INDUSTRY



ROSS H. McMASTER
President Steel Co.
of Canada



C. W. SHERMAN
President Dominion Foundries
& Steel, Ltd.

been in the past decade or more, having taken a total of 168,685 tons from the British Isles. The peak year of the post-World War era in Canadian imports of iron and steel from the United States was 1929, when the total was 1,123,012 tons. (All of these figures include pig iron and ferro-alloys.)

During the World War, when Canada was supplying a large amount of shells and other munitions to Britain, the importations of steel from the United States were very large. Some of the peak World War items were 153,745 tons of pig iron in 1917, 66,558 tons of rails in 1918, 117,306 tons of shapes in 1917, 44,754 tons of wire rods in 1917, 258,412 tons of plates, sheets and strip in 1917, 215,075 tons of wire nails in 1917, 60,000 tons of wire in 1916, and 65,116 tons of tin plate in 1918.

These figures show the potentialities of United States steel trade with Canada during war times. In all probability the orders placed for steel in the United States during this war will be smaller than in the 1914-1918 war unless the character of the war greatly changes, but it is believed that our orders from the Dominion will eventually be substantial, especially if Canadian industry is geared up to such a high pace on war work that Canadian mills will to a large extent be unable to handle the needs for non-war activities.

According to the Dominion Bureau of Statistics, the value of Canadian imports of iron and steel in 1937 (the recent peak year) was \$211,002,837, an increase of 56 per cent over the previous year. Of this amount, purchases from the United States totaled \$173,864,866, or 82 per cent, against \$29,794,323 from the United Kingdom, or 14 per cent. Exports and re-exports amounted to \$68,249,994, of which only \$8,822,416, or 13 per cent, came to the United States and \$15,104,517, or 22 per cent, went to the United Kingdom.

The year in which imports of iron and steel and their products reached the largest volume was 1929, when the

value was \$345,194,621, of which \$316,195,527 was the value of imports from the United States and \$18,802,533 from the United Kingdom, with \$10,296,537 from other countries.

The gross selling value of all iron and steel and from products made from iron and steel in Canada during 1937 was \$624,819,877, which was an increase of 37.8 per cent over the similar total of \$453,385,553 in 1936. The gross selling value of such products in the peak year of the World War (1918), when prices were higher than in 1936 or 1937, was \$793,080,850. The low year was 1933 with a total of \$211,961,908. The number of employees engaged in such activities in 1937 was 127,148, compared with a peak of 144,413 in 1917.

Capital employed in the iron and steel and allied industries has declined in recent years, having been at a peak in 1930, when the total was \$757,797,256. In 1937 the total capital was \$651,398,528.

Large Mineral Development

While the value of all manufactures in Canada has not increased greatly during the post-World War period, having totaled \$3,623,159,500 in 1937 against \$3,227,426,397 in 1918, there has been a much larger development of mineral production and refining. In 1918 the total amount of copper produced was 118,769,434 lb., which in 1938 had expanded to 585,521,538 lb. Over the same 20-year period lead production gained from 51,398,002 lb. to 417,399,800 lb., zinc production from 35,083,175 lb. to 374,615,462 lb., nickel from 92,507,293 lb. to 209,305,951 lb., gold from 699,681 oz. to 4,679,685 oz., while petroleum output increased from 304,701 bbl. to 6,870,000 bbl. Wood pulp, one of Canada's leading exports, expanded from a total of 1,557,193 tons in 1918 to 5,141,504 tons in 1937. (These figures were compiled from official statistics by the Canadian Bank of Commerce, Toronto.)

Interest in the probable effect of the war on Canada's economic organization
(CONTINUED ON PAGE 82)

THIS WEEK ON THE

By W. F. SHERMAN
Detroit Editor

ASSEMBLY LINE

... Foremen's union demand poses question for auto industry ... New order volume increases daily production rate, but holiday cuts week's total ... Army orders \$7,000,000 worth of trucks from three manufacturers ... Steel tonnages still offered buyers in Detroit.

DETROIT—Recent developments in the automotive labor situation pose a difficult problem for management and labor to thresh out. This problem—which hinges around the question of union organization of factory foremen—has existed before, but generally on a minor scale. It has been solved in various instances by older unions in varied ways, including the prohibition of foremen membership in unions, their inclusion with relatively limited participation in union activities and, in some cases, the inclusion of foremen in union membership, but without union "protection" of their jobs.

The demand of the CIO foremen's union for a bargaining conference with Chrysler executives precipitated last week almost a stalemate in current strike negotiations and also started a difficult new chapter in automotive labor history. The foreman issue came at an unfortunate time, if one considers that a strike settlement seemed imminent, but fortuitously, some believe, because under present circumstances there is possibility of a

clear-cut settlement. The issue has raised its head often enough in the past to indicate that, if a complete and rapid settlement of this moot point is not made, there will be a lot of unpleasant reviews later.

Certainly management is correct in assuming that a line must be drawn somewhere in union organization efforts if management is to maintain its entity. In the Chrysler negotiations, the corporation maintains that foremen are its representatives through whom "management mainly deals with employees." Chrysler continues its case:

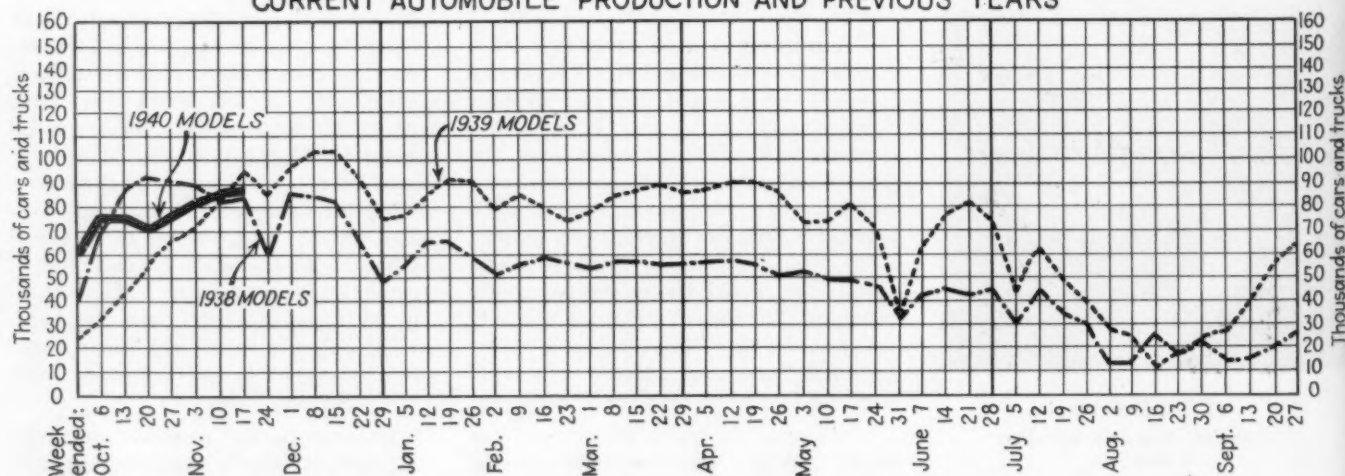
"An important part of the program of collective bargaining, as we understand it, centers around the grievance procedure and provides machinery for prompt settlements. In the collective bargaining procedure, the foreman, as management's representative, performs an essential role. It is the foreman's duty, representing management, to receive, to consider and to adjust his employees' grievances in the first instance. The employee or his union representative first takes up the matter with

the foreman and the foreman tries to settle it then and there. Most grievances are settled in that way and never go any further. It is only when the foreman is unable to adjust a grievance on behalf of the management that it goes up higher in the management."

The UAW has denied that foremen function as management representatives because "foremen, a number of years ago, were stripped of their power to represent the corporation in collective bargaining with production workers," and insists that in the Dodge truck plant "the lowest ranking supervisory employees who represent the management are the department heads."

In this instance the negotiators are not even talking about the same thing. Chrysler has alleged that there is a conflict on the score that foremen act in grievance cases; the union talks about "collective bargaining." Apparently this new issue, unionization of foremen—will be settled eventually by arriving at definitions that satisfy. There is some justification in the automobile industry for more general adoption of the term "group leader" instead of "foreman." Inasmuch as some groups of foremen are known to be organized, some practical observers see an advantage for management in devaluing the foremen's position in a degree greater than that already accomplished—willingly or not—in many large mass production plants.

CURRENT AUTOMOBILE PRODUCTION AND PREVIOUS YEARS



Source: Ward's Automotive Reports

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This makes it necessary for foremen to choose their own status—becoming merely group leaders with union affiliations or true management representatives. Probably the character of past operations in the plants would largely determine the choice. Naturally in plants where management has well-trained foremen functioning as such in the true sense of the word and really representing the management, it would be expected that the foremen would stay on the management's side of the fence.

Volume Remains High

Volume of orders for new automobiles is so large that not even the Thanksgiving holiday could cut in seriously on the total automobile production. There was a decrease from 86,700 to 72,520, but the decline was less than seasonal and the daily average output actually was larger than in the previous week, according to Ward's Automotive Reports. The total was less than the number of assemblies in the corresponding week a year ago, when 84,730 vehicles were assembled.

Thus while Ford assemblies dropped

from 22,000 to 18,100, the daily rate increased from 4400 to 4525. Lincoln-Zephyr output for the week dropped from 615 to 500. Chevrolet's operations for the week resulted in 23,000 assemblies, compared with 28,000 in the previous week. General Motors, as a whole, assembled 40,240, as against 48,635 in the previous week.

The backlog of orders for new cars is considered amazing for this time of year. Deliveries extend from three to 10 weeks in certain instances, it is reported, with a great many manufacturers unable to fill an order in less than five weeks. This indicates continued high production to the end of the year and perhaps beyond. In some sections, floor samples of new cars are scarce. Chrysler dealers' sales rooms in the Detroit area have no floor samples left, and there are known to be instances where Chrysler salesmen have given up their demonstrators and are driving trade-ins themselves.

In Ohio, the Unemployment Compensation Commission is trying to decide whether salesmen of Chrysler, Plymouth, DeSoto and Dodge cars are entitled to unemployment benefits be-

cause the strike in Detroit has left them without cars to sell.

Truck manufacturers continue to benefit from military orders for vehicles. One of the most recent is a U. S. War Department order for 5402 motor trucks, costing approximately \$7,000,000. Largest award, \$3,832,255, went to Fargo Motor Corp. (Chrysler) for 3122 1½-ton cargo trucks. Fargo also got an order for 491 1½-ton trucks costing \$740,182 and for 323 trucks of the same size costing \$411,986.

The Yellow Truck & Coach Mfg. Co., Pontiac, Mich. (GM) received a \$2,970,976 order for 1445 2½-ton trucks and for 21 trucks of the same size costing \$49,683.

Chevrolet will build 303 ambulances on a contract price of \$312,475; 260 light sedans, \$151,522, and 14 ½-ton trucks for \$8,501.

Two truck companies pass into oblivion through court action—a Federal court last week authorized the sale of Reo Motor Car Co. machinery appraised at \$900,000; the LaFrance-Republic Corp., of Alma, Mich., once known as the world's largest manufacturer of motor trucks, was dissolved in a county circuit court also last week. During the World War this company sold many trucks to the United States Army and to the Allied nations.

Meanwhile, there comes to light the fact that Packard Motor Car Co. quietly passed the 40th anniversary of completion of its first car on Nov. 6. Apparently everyone was so busy with 1940 models that no one thought of a celebration. Orders are piled so high that on Saturday after Thanksgiving (celebrated on Nov. 23) Packard plants operated to make up for production sacrificed on the holiday.

Detroit steel buyers have learned in the last week that there are some openings on the rolling schedules of non-integrated mills for rollings during December, for December delivery, at fourth quarter prices. It is understood that these mills were the ones which were cautious in accepting orders during the early fall rush.

Assembly Line Notes

General Motors Corp. paves the way for appeal on the anti-trust conviction in the finance case by filing a motion at South Bend for a new trial. . . . Interchangeability is worked seriously by the automobile companies, one builder is said to be producing seven different lines of cars with only three different lines of engines; another has five lines and three engines with iden-

THE BULL OF THE WOODS

BY J. R. WILLIAMS



tical bore. Doors in some cases are said to fit four or five cars bearing different names. . . . For 1940 GM, through five of its divisions, is producing 95 passenger body types including station wagons, but not commercial vehicles. . . . Continental Motors Corp., which moved from Detroit to Muskegon because of high tax burden, has an order for tank engines worth approximately \$1,000,000; specifications are incomplete but production is expected late in the first quarter of 1940. While assemblies are in Muskegon, Detroit parts manufacturers are understood to make 85 per cent of the parts. . . . Hudson has announced an automatic Weather-Master fresh air and heat control. . . . Detroit has not gone "red" through the mayoralty election, according to William P. Lovett, secretary of the Citizens League (conservative). He characterized Mayor Reading's campaign charges against Edward J. Jefferies, Jr., mayor-elect, as "political propaganda." Unfavorable publicity constitutes "a problem for the business interests and political leaders of Detroit," Lovett said. . . . Detroit employment index is higher than a year ago, despite the Chrysler strike. Board of Commerce reports the Nov. 15 index at 97.8 compared to 92.8 a year ago and 102.4 on Oct. 30. . . . Manufacture of 1940 auto license plates for Michigan required 1600 tons of 24 gage steel and 13,500 gal. of paint; there will be 2,220,550 sets of plates. . . . Plastics experts say auto manufacturers would save millions of dollars every year if they had available sheet metal that required no finishing or surface processing before painting; in other words, super-quality finishes on sheets would thwart any possible advance of plastics in auto body field. Formerly assigned to steel research, this expert urges more activity in this field by steel industry. . . . Ford is spending \$250,000 to expand power house, Mercury assembly line and Mercury body finishing shop, also to construct a half-mile test track, at South Chicago plant. . . . Fruehauf Trailer Co. is completing another addition. Its standard body plant is increased 78,000 sq. ft. August, September and October have been the biggest months in the history of this company. . . . Three hundred workmen have been recalled this month by Libbey-Owens-Ford Glass Co. to its grinding and polishing plant in East Toledo, Ohio. Demand for automotive safety plate glass now requires the operation of a third line of machines for the first time in more than two years. Twelve hundred men are employed in four daily shifts.



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NITRIGAGES

GAGEMAKERS

THIS WEEK IN WASHINGTON

... Administration to push Roosevelt's idea of development of steel industry in the West through utilization of cheap water power . . . Pay-as-you-go plan of raising money for national defense may meet with opposition in Congress.

By L. W. MOFFETT

The Iron Age

WASHINGTON—Based upon a White House statement, a press conference pronouncement by Interior Secretary Ickes, and questions directed to steel industry spokesmen by members of the Temporary National Economic (anti-monopoly) Committee during the recent steel hearings, the New Deal would like to see the steel industry "go West." That is, it would like to see additional steel facilities built on the West Coast.

Back of the move, of course, is (1) the Administration's efforts to find new industrial consumers for hydro-electric power generated by isolated New Deal power projects in the West; (2) a New Deal theory that decentralization is an integral part of a successfully planned economy; and (3) a War and Navy Department recommendation that key industrial centers, now considered vulnerable to air attack, ought to be more widely distributed in the interest of national defense. (See THE IRON AGE for Nov. 2, page 75).

An Old Hobby of Roosevelt

Explaining that it had been an old hobby of his, having been interested in the subject since 1913, President Roosevelt launched the West Coast steel expansion move at a press conference on Oct. 31 when he went on record in favor of building additional steel facilities.

Referring to studies conducted by the Geological Survey, the Bureau of Mines and the Department of Commerce, which he said indicated that there were adequate supplies of Western ore, Mr. Roosevelt insisted that electric power available from Bonneville and Grand Coulee Dams was cheap and plentiful and that electric power was becoming increasingly important in the manufacture of steel.

The President told his press conference that he would like to see the steel industry expanded so it could utilize western ore, Western electrical power and Western labor. His opinion was that it would be a business success and that economically it would be a sound thing to do.

Up to Steel People

Asked what objection there had been to the construction of additional steel mills on the West Coast, the President replied that it would be necessary to query the steel people.

Whether members of the TNEC took their cue from the President's statement is a matter for conjecture, but A. H. Feller, Justice Department attorney who directed the steel inquiry, asked innumerable questions of steel industry spokesmen about various phases of the industry on the Pacific Coast.

Without referring to the President's remarks, Benjamin F. Fairless, president of the United States Steel Corp., cited the corporation's subsidiary, Columbia Steel Co., in San Francisco, during his testimony and told the committee:

"The steel plants of the Columbia Steel Co. do not make a full range of products on the Pacific Coast for the reason that the demand is not sufficient to cause the investment in the equipment necessary to make a full line of products. Also, the nature of the business on the Pacific Coast, generally speaking, in the products manufactured by the Columbia Steel Co., and in the size of the orders, is relatively small as compared with Pittsburgh and Chicago districts."

Ickes Wants Plants in West

Even giving due consideration to the circumstances under which Pres-

ident Roosevelt made his announcement about West Coast steel mills—two Congressmen from California, Frank Roberts Havenner, Democrat, and Richard J. Welch, Republican, had called on the President earlier in the day about increasing naval shore facilities in California as a result of a further increase in naval strength—the White House statement was considered significant.

On Nov. 16, Secretary of Interior Harold Ickes, one of the more vocal members of the New Deal's high councils, took up the cry and told a press conference that his department was interested in the construction of additional steel plants in the far West and that the Bureau of Mines and the Geological Survey, both of which are under his department, may send men into Washington, Oregon and possibly Idaho to explore undeveloped iron ore deposits. Reportedly slated to become the New Deal power coordinator, with the National Power Policy Committee already under his wing and the Federal Power Commission believed to be on its way into the Ickes sanctum, the Secretary of Interior pointed out that West Coast steel plants could serve as an outlet for power produced in the Northwest and could utilize low-grade ore deposits not profitable at present. Developments of these deposits would be left to private capital, he said.

Based on Engineers' Report

Although puzzled, some observers thought that the remarks by President Roosevelt and Cabinet Member Ickes may have been based upon a comprehensive study conducted by Army engineers prior to 1933 when the subjects of hydro-electric and industrial development on the Columbia River were still in the blueprint stage. Reference to the report made to Congress by the War Department in 1933, identified as "Columbia River and Minor Tributaries," reveals that while Army engineers did not commit themselves on the possibilities of expanding steel production on the Pacific Coast, they compiled a wealth of material in evaluating the future industrial potentialities of the West in terms of national resources and hydro-electric development.

Going into the subject of iron and steel production, the report said:

On the subject of electric furnace possibilities for the future—that it is

Reduce Costs with Overhead Handling



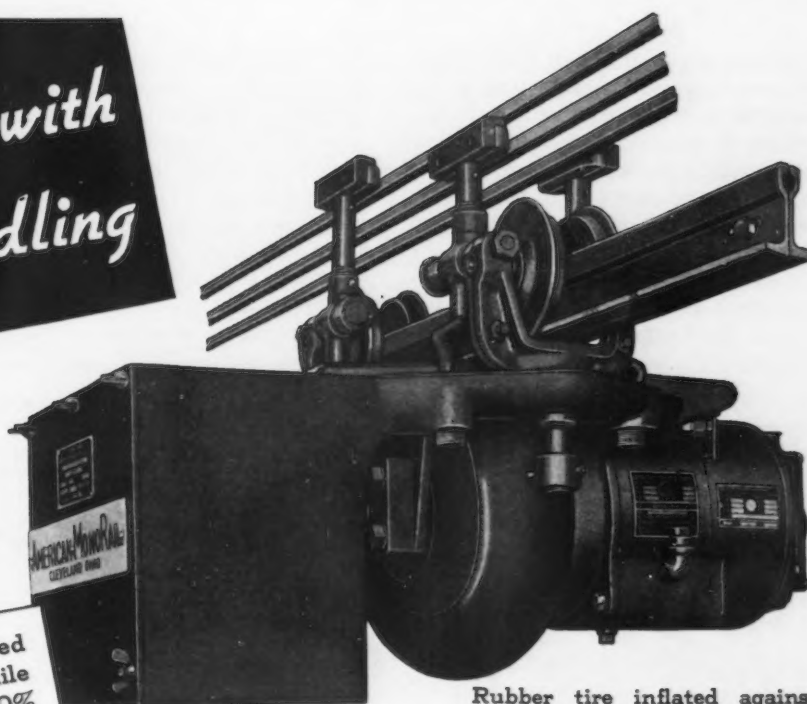
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replacing coal, oil or gas fired equipment in copper alloy mills, steel works and rolling mills and that it will add greatly to the electric load carried by such mills; that, while electric-furnace production of iron from its ores is carried on in Norway, Sweden, and Italy, iron and steel of high quality has also been produced in this country, there is so small a market that manufacture has not been able to proceed on a commercially profitable

scale and successfully compete with blast furnace practice; that some metallurgists, believing that the depletion of Lake Superior hematite iron ores will result in about 30 years, think that the development of magnetite iron ore deposits may point to their reduction by low-temperature processes such as preheating in a rotary fuel furnace followed by melting and refining in an electric furnace.

On the subject of Western iron ore

and coal deposits — that the region, lacking in iron ore, has only one Western state—Wyoming—with extensive and rich iron-ore deposits, with Washington, Colorado, and Utah having excellent deposits of coking coal.

On the subject of Pacific Coast production and consumption — that the area consumes approximately 2,500,000 tons of steel out of a total consumption of \$56,000,000 tons with one sixth of the demands being met by Pacific Coast steel works; that while these works fill approximately 60 per cent of orders for merchant bar, they do not produce pipe for local oil, gas and water companies; that they produce only a small part of the tin plate for the Pacific Coast and that the growing demand for food industries for stainless steel should interest Pacific Coast mining and metal manufacturing, canning and packing industries.

Steel's Power Consumption

Noting that in steel works and rolling mills the power requirements are very great even where no electro-metallurgical processes are used, the reports covered in detail power requirements of various electrochemical processes and electric power consumed by such processes in 1929. It listed the estimated power requirements for the reduction of magnetite ore as offering future possibilities for consuming more power than any other single steel process listed, or a total of from 2000 to 2500 kw-hr. per ton. Next in line were the duplex system of continuous electric melting for iron castings, requiring an estimated 115 to 550 kw-hr. per ton; electric annealing or hardening of steel, requiring an estimated 182 to 286 kw-hr. per ton; and electric galvanizing or electrozincing, 101 to 230 kw-hr. per ton.

The report, observing that the taking over of Pacific Coast iron and steel works by the Steel corporation and by Bethlehem Steel in 1929 was "an interesting development" and indicative of the increasing demand for steel on the West Coast, included this statement which, some observers said, may be striking the fancy of Administration planners:

"Seven eighths of all iron ore consumed in the United States comes from the Lake Superior region. As the estimated life of these deposits is drawing to a visible end at present consumption rates, radical changes may occur in the iron and steel industry in another quarter century. A large iron and steel firm has already secured control of some iron ore de-

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posits in South America. Some experts believe China will export iron ore to this country.

Abandonment of Blast Furnaces?

"Others believe that the exhaustion of hematite ores in the United States will bring with it the abandonment of the blast furnace and the adoption of low-temperature reduction furnaces operated by gas, oil, or electricity on magnetite iron ores of far Western and Eastern states. If any one of these predictions prove correct, the iron and steel industry will tend to move to locations that can be reached by ocean shipment. Under existing conditions, it is gradually moving westward."

Conceivably, New Deal power experts also are interested in this statement in the report:

"Blast furnaces, steel works, and rolling mills outrank all other industries in installed horsepower, only three fourths of which is electric horsepower. This ranking position is due to the fact that iron and steel tonnage exceeds all other metal, chemical, or paper tonnage by many millions, rather than to unit power requirements of iron and steel products. But electrification of steel works and rolling mills is proceeding rapidly not only for mechanical operations but for heating processes.

"In 1929, 1 per cent of steel ingots were refined in electrically heated furnaces requiring approximately 210 kw-hr. per ton molten charge. Such electric refinement consumed 125,000,000 kw-hr. of energy. Twenty-six per cent of steel castings were melted in electric furnaces, consuming from 500 to 760 kw-hr. per ton cold charge. An increasing number of electric furnaces are employed in the heat-treatment of alloy steels and carbon steels, specific operation requiring from 50 to 500 kw-hr. of current. Electro-galvanizing, electrozincing, and electroplating are also increasing.

"Probably the best measurement of the part all power, regardless of source, plays in steel works and rolling mills today and the part which electrical power and heat may play in the future is gained by a comparison of the present cost of fuels and electricity in steel works and rolling mills and the market value of all manufactures. Electricity and fuels form 6.6 per cent of the total market value of products today."

In addition to questioning Steel corporation officials on the difference in prices at San Francisco and Pittsburgh, members of the TNEC also displayed considerable interest in the Pacific

Coast situation at the steel hearings by (1) asking the Steel corporation and Bethlehem Steel to submit in January comparative figures reflecting Western and Eastern costs; and (2) asking a representative of the Pacific Coast Independent Fabricators Association if the establishment of competing steel mills on the West Coast would be a factor in changing existing pricing policies.

T. A. L. Loretz, representing the independent fabricators, told Isador

Lubin, Commissioner of Labor Statistics and Labor Department representative on the TNEC, that in his opinion additional capital for new steel facilities on the Pacific Coast was not needed and would not help the situation about which he was complaining. Characterizing his relations with present steel mills on the West Coast as "very pleasant," Mr. Loretz said that his only point of difference was that steel sold there "is not based on cost of production."



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Census to Yield Complete Data On Steel, Consuming Industries

WASHINGTON — Since 1937, executives in the steel industry have witnessed a series of fluctuations in their sales and production curves, and changes in their markets—and this year is no exception. Today, more than ever before, they appreciate the need for known, funda-

mental facts upon which to base their future plans.

Early in January the United States Census Bureau will start collecting the facts and figures on this year's activities in the iron and steel industry—and in all steel-consuming industries. The sixteenth decennial census

will open Jan. 2 with the censuses of manufactures, of business, and of mines and quarries. April 1 marks the beginning of the censuses of population, employment and income, agriculture drainage and irrigation, as well as a census of housing, which will be taken for the first time in 1940.

List Activities of 170,000

The census of manufactures will record the activities of 170,000 manufacturers—their production, their cost of manufacture, materials, equipment and labor. The census of business will record the sales of manufacturers and of more than a million and a half distributors—wholesalers and retailers. It will also include the activities of 200,000 construction contractors. The census of mines and quarries will cover 1000 iron and non-ferrous ore producers and 14,000 coal mines.

The 1937 census figures showed that the products of the steel works and rolling mills, that year, were valued at well over \$3,250,000,000—more than 72 per cent higher than in 1935 and 191 per cent higher than in 1933. Blast furnace production increased in value during the same periods 79.5 and 214.7 per cent, and iron and steel forgings climbed in value 85.1 and 277.7 per cent. How will the figures for this year compare with those two years ago?

The data collected in 1940 will show not only the total production this year, but the consumption of each of the major markets. Exact figures will be tabulated on the tonnage of flat rolled steel, for example, which finds its greatest market in the automobile industry; on the production of structural steel, of rails, rail joints and tie plates; and of tin plate, which is largely consumed by the can industry.

Check on Stainless

In addition to the tonnage by the major markets, that consumed by new and growing industries will be revealed—new business created by new uses for steel products. For example: Flat rolled steel now being used in the construction of fabricated steel houses; and stainless steel, which is beginning to displace non-ferrous metal.

Complete figures will be given on the consumption in the mills themselves of the materials produced there, or further fabricated and processed within the same plants. Officials of the steel plants will be in a position to compare these figures with those for 1937 and sales executives will be



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mitted to the normal rolling contact surface and since there is no need for auxiliary means for taking the thrust there is no possibility of rollers pinching and binding.

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interested in comparing these data with sales statistics.

Production officials can measure their own company's performance by using as a yardstick the data to be made available on the costs of manufacture, equipment and materials used and purchased during the year, and the electric energy and fuel consumed. For the first time since 1929 there will be figures on the number and capacity of prime movers and generators. There will also be data-compiled for the first time—on the expenditures during the year for new equipment and plant expansion.

The information collected on materials used by steel consumers will be extended, next year, to cover many small industries previously omitted in this tabulation. The materials used by the hardware industry, for example, will be itemized, as well as by boiler shops, by the producers of structural fabricated products, and even the makers of such products as saws and files.

Of special interest to market analysts is the fact that their work will be simplified by a further breakdown and re-arrangement of steel-consuming groups. "Gray iron and malleable iron," for instance, previously grouped together, will be separated into individual industries. Stoves and ranges, which were previously listed under "heating and cooking," will be given a separate classification.

Will Include Sales Data

The census of business, next year, will include data on the sales of manufacturers. This compilation, coupled with that of the sales of wholesalers and retailers, will be valuable to sales and marketing staffs. It will complete the picture of sales this year, and will form the basis for any sales and marketing plans.

The agricultural census, used in conjunction with the data on the makers of farming equipment, will be an index to the extent of mechanization on the farms and to the potentialities of this market for steel.

The census of population will provide those who wish to study consumer purchasing power the most complete information on this subject ever compiled by the census bureau. It will include the income of the people in each community, their occupations, how many have jobs and how many are jobless, their educational level, and the cost or rental value of their homes. This information will be especially useful when coupled with the

data in the housing census, which will cover 33,000,000 dwellings. Added light will be thrown on the trend of migration of the population by the answers in the population census to the question, "Where did you live five years ago?"

To make the information to be collected as valuable as possible to business men, the Census Bureau obtained the advice and help of business men themselves when formulating the questions.

May Revive Bill to Curb Exports to Japan

WASHINGTON—A statement by Under Secretary of State Sumner Welles that this country should take a serious view of the continued Japanese interference with American rights in the Far East, and a simultaneous report that Japan is reviving scrap purchases in this country, stimulated interest on Capitol Hill last week in the Pittman resolu-



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tion to embargo scrap, iron and steel, oil and gasoline exports to Japan.

Senators Arthur Capper, Republican, of Kansas, and Pat Harrison, Democrat, of Mississippi, both members of the Senate foreign relations committee, indicated that the resolution will be revived when Congress reconvenes.

The Pittman resolution aims to restrict or prohibit exports of arms, ammunition and implements of war as well as iron, steel, oil, gasoline, scrap iron, scrap steel and scrap metal containing a combination of iron and steel and other metals.

Die Makers Under Labor Standards Act

WASHINGTON — Employees who make tools and dies which are used in the production of goods for interstate commerce, even though the tools and dies themselves do not move in interstate commerce, were brought under the provisions of the Fair Labor Standards Act last week when George A. McNulty, general counsel of the Labor Department's wage-hour division, issued the latest interpretative bulletin. It said:

"The legislative history indicates that the act was intended to apply to employees who make or create tools, dies, patterns, designs, or blueprints, all of which are sold within the state to a local purchaser who uses the tools, dies, patterns, designs, or blueprints in the production of goods which move in interstate commerce."

With reference to tool designers and others engaged in a so-called professional capacity, the interpretation pointed out that the law already provides exemption from the wage and hour provisions for professional workers.

Navy Department Awards

WASHINGTON—The Navy Department's Bureau of Supplies and Accounts has awarded contracts to the following companies:

Consolidated Machine Tool Corp., Rochester, N. Y., planers, \$248,550; General Machinery Corp., Niles Tool Works division, Hamilton, Ohio, planers, \$248,550; William Sellers & Co., Inc., Philadelphia, planers, \$248,550; Eastern Rolling Mill Co., Baltimore, sheet steel, \$13,244; Baldt Anchor, Chain & Forge Corp., Chester, Pa., anchors, \$5032; Steel & Wire Products Co., Baltimore, wire nails, \$5200; Kennedy Valve Mfg. Co., Elmira, N. Y., bronze valves, \$18,287.

Pressure From Ickes May Pinch Consumers of Coal

WASHINGTON — Because Secretary of Interior Ickes has put his coal division on the carpet, directing that minimum prices be fixed on bituminous coal well ahead of the April 1 contracting season, coal consumers will feel the pinch of higher spot prices under Government auspices within the next three months if present plans are carried out.

If minimum prices are made effective, it will be, with but one exception, the first time since August, 1935, when the Government was given coal price-fixing powers, that the Administration has been able to invoke this authority. The exception was in December, 1937, when minimum prices were effective for one month, then suspended by the now-defunct National Bituminous Coal Commission after the courts granted special concessions to one large coal producer and to members of the Association of American Railroads.

Two Obstacles in Way

Two obstacles, neither of which is expected to defer the fixing of prices for many more weeks, stand in the way of the Secretary's price-fixing goal. First, the industry stands in a better position today than it has for some time, with coal demand running high and the average price of coal increasing approximately 7c. a ton due to the war-stimulated flurry of the past few months, but prices have since settled somewhat. Second, there is formidable opposition to the activities of the Interior Department's coal division within the industry, centered in a group of operators anxious to have the coal law modified or removed from the statute books completely.

Nevertheless, Secretary Ickes, who has had the job of "stabilizing" the coal industry since last May, when the political-infested coal commission was abolished, has passed the word along to make all haste in conducting industry price conferences, preliminary to invoking the Government's price fixing schedules. Ickes, who privately claims he was unwilling to accept the coal job in the first place, but who has never been known to turn down additional powers during his six-year New Deal tenure, is believed to be in for a stormy season ahead if, as rumored, he eventually will take the Federal Power Commission under his wing.

Already vested with administrative authority under the oil conservation law, the bituminous coal law, and head of the National Power Policy Committee, Mr. Ickes' versatility will be subjected to rigorous test if his domain is broadened to encompass the field of electric and gas power in addition to oil and coal—all competitive fuels. Conflicts between Government agencies espousing the cause of a particular fuel already have been the subject of bitter internal friction in New Deal circles.

Government Steel Orders

WASHINGTON—Government contracts for iron and steel products, as reported for the week ended Nov. 18 by the Labor Department's Public Contracts Division, totaled \$1,448,567. For the same period contracts for non-ferrous metals and alloys amounted to \$217,722, and for machinery, \$2,094,724. Details follow:

Iron and Steel Products

M. Mocoora Arsua, Inc., San Juan, Porto Rico, Porto Rico, pipes and fittings	\$19,350
J. A. Carter Co., Inc., Los Angeles, Navy Yards & Docks, replacement of boilers	20,395
Dravo Corp., Philadelphia, Navy Yards & Docks, boiler	87,580
Riley Stoker Corp., Worcester, Mass., Navy Yards & Docks, boilers	381,934
Smith Corp., General Iron & Steel Co., Portland, Ore., Interior, radial gates and Eoists	13,707
American Radiator & Standard Sanitary Corp., Denver, Interior, fabricated pipe	185,660
American Rolling Mill Co., Middletown, Ohio, Navy Yard, sheet metal extension	16,150
United States Steel Export Co., Pittsburgh, Panama Canal, steel	14,000
Bethlehem Steel Co., Johnstown, Pa., Panama Canal, steel bars, plates ..	10,097
United States Pipe & Foundry Co., Philadelphia, Panama Canal, pipe, water, cast-iron	71,640
Kane Mfg. Corp., Kane, Pa., Navy Yards & Docks, window, door and transom screens	15,164
Fort Pitt Bridge Works, Pittsburgh, Panama Canal, fabricated structural steel	201,544
American Bridge Co., Boston, War Ordnance, car frame ends	13,028
Sheffield Steel Corp., Kansas City, Mo., Interior, reinforcement bars	13,402
Bethlehem Steel Co., Bethlehem, Pa., Navy S & A, slides	170,500
Pressed Steel Tank Co., West Allis, Wis., Navy S & A, blank shells ..	34,374
Lukenweld, Inc., Catesville, Pa., Navy S & A, slides	44,856
Bethlehem Steel Co., Sparrows Point, Md., Panama Canal, reinforcement bars	53,456
Sheffield Steel Corp., Kansas City, Mo., Panama Canal, reinforcement bars	43,506
Widin Metal Goods Co., Garwood, N. J., War Signal Corps, mast base ..	37,820

Non-Ferrous Metals and Alloys

American Brass Co., Waterbury, Conn., War Ordnance, gilding metal	28,620
Revere Copper & Brass, Inc., Baltimore, Md., War Ordnance, cartridge cups	99,000
Revere Copper & Brass, Inc., Baltimore, Md., War Ordnance, jacket cups	43,900
Fulton Syphon Co., Knoxville, Tenn., War Ordnance, element plugs	17,094
Bohn Aluminum & Brass Corp., Detroit, War Ordnance, brass rod	29,107

Machinery

Colonial Broach Co., Detroit, War Ordnance, broaching machines	\$35,665
The Hanson-Whitney Machine Co., Hartford, Conn., War Ordnance, milling machines	26,176
Austin-Hastings Co., Inc., Cambridge, Mass., War Ordnance, surface grinders	14,584
Orton Crane & Shovel Co., Chicago, Navy Yards & Docks, cranes	194,227
R. W. Kaltenbach Corp., Bedford, Ohio, Navy Yards & Docks, dry dock crane	123,550
Harnischfeger Corp., Milwaukee, Navy Yards & Docks, bridge cranes	29,100
The John Van Range Co., Cincinnati, Navy Yards & Docks, bakery equipment	37,143
C. H. Wheeler Mfg. Co., Philadelphia, Navy Yards & Docks, condensers	30,150
The Cleveland Crane & Engineering Co., Wickliffe, Ohio, Navy Yards & Docks, wall cranes	46,465
Shaw-Box Crane & Hoist Division, Manning, Maxwell & Moore, Inc., Muskegon, Mich., Navy Yards & Docks, bridge crane	20,689
Pratt & Whitney Division, Niles-Bement-Pond Co., Hartford, Conn., War Ordnance, precision lathes	25,848
The Monarch Machine Tool Co., Sidney, Ohio, War Ordnance, lathes	77,668
Link-Belt Speeder Corp., Cedar Rapids, Iowa, War Ordnance, power shovel	10,760
Read Machinery Co., Inc., York, Pa., War Ordnance, mortar and mounts	187,830
York Ice Machinery Corp., York, Pa., War Air Corps, refrigerating system	189,294
S. Blickman, Inc., Weehawken, N. J., Navy Yards & Docks, kitchen, scullery and cafeteria equipment	119,980
Harnischfeger Corp., Milwaukee, Navy Yards & Docks, bridge cranes	300,690
The Cooper-Bessemer Corp., Mount Vernon, Ohio, Navy Yards & Docks, air compressor	196,500
The Cooper-Bessemer Corp., Mount Vernon, Ohio, Navy Yards & Docks, air compressors	45,199
Cory & Joslin, Inc., San Francisco, Navy Yards & Docks, steam generating plant	196,500
Farrel-Birmingham Co., Inc., Buffalo, War Ordnance, machining training circles	15,580
Morton Mfg. Co., Muskegon Heights, Mich., Navy S & A. machine, cutter	10,950
The G. A. Gray Co., Cincinnati, Navy S & A. planer	105,638
Brown & Sharpe Mfg. Co., Providence, War Air Corps, grinders	22,165
The C. H. Gosiger Machinery Co., Dayton, Ohio, War Air Corps, grinder	13,560
Brown & Sharpe Mfg. Co., Providence, War Air Corps, milling machine	18,812

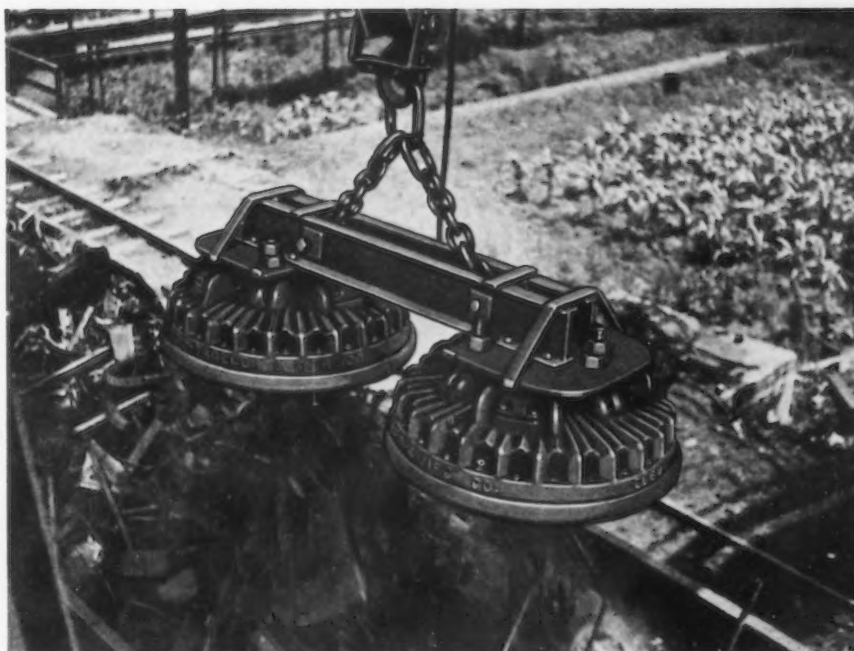
Berted Foundry Expands

CLEVELAND—The Berted Foundry Co., operated at Columbiana, Ohio, for the last few years by E. A. McDonald and Bert Flint, has expanded operations with the purchase of the State Foundry & Pattern Co. plant at Akron. Headquarters will be maintained in Columbiana. Marion Poulton, formerly of Columbiana, is manager and salesman for the State Foundry.

"Natural Recovery" Chief Cause of Business Upturn, Grace Says

A "NATURAL RECOVERY" is the chief cause of the business upturn, E. G. Grace, president, Bethlehem Steel Corp., says in a letter to employees. The letter appears in the December issue of the *Bethlehem Review*.

"It is gratifying," Mr. Grace said, "that our products are going largely into consumption and not into inflated inventories and that the buying movement does not represent important demand from the warring countries. . . . We must, however, always serve



TWO Magnets on SINGLE Hook speed up Operations . . .

Situated on the Ohio River, this twin-magnet installation on a single crane-hook has materially speeded up the transferring of scrap from river barges to railroad cars. This dual arrangement has the advantage of loading more cars per hour . . . cutting down the time that barges are tied up for unloading. Compared with a single Magnet of the next larger size, these two Magnets average from 35 to 55% more material per hour, depending upon the type of scrap handled.



HEAVY DUTY MOTOR CONTROL FOR CRANES, MILL DRIVES AND MACHINERY • BRAKES • LIMIT STOPS • LIFTING MAGNETS AND AUTOMATIC WELD TIMERS.

At many transfer points, either from river-to-rail, or rail-to-sea, in which crane-hoist travel and crane-trolley travel are of considerable distance, this method of magnet operation permits a major saving in material-handling costs. Contact our nearby sales office for information on the size of magnets suited for increasing the output of your crane. Do it today. No obligation, of course.

our own government for the materials it must have for national defense."

Average Hourly Earnings Up

Bethlehem employment conditions are better than in any past period, Mr. Grace said. There are now more than 100,000 employees receiving average earnings per day of \$7.03, and the rates of pay for employees are stated to be "the highest in the history of the business."

"When we consider," he said, "that the present levels of steel prices are about the same as those existing in 1929, and also the gratifying fact that employees' average hourly earnings are over 30 per cent higher than in 1929, we have every reason to feel that it is a job well done."

An increase in the current pension rates, through canceling the 15 per cent cut in depression years, is announced in the *Review*. Regarding espionage, the bulletin says, "Because of the gravity of the misuse of information pertaining to national defense materials, the Navy Department is desirous that employees shall understand the provisions of the Espionage Act of June 15, 1917."

Decatur Casting Co. Holds Open House

THE Decatur Casting Co., Decatur, Ind., on last Saturday held an open house at its plant for employees and the public. A display of customer's products was held at the foundry in connection with the celebration. In addition to finished products the company displayed completely machined castings. Displays of raw materials used in producing castings and of typical molders, core-makers, chippers and inspectors also were shown. Don McDaniel is president of the Decatur company and George A. Rentschler is vice president.

Tennessee Products to Make Ferromanganese

CARL McFARLIN, president of Tennessee Products Corp., Nashville, Tenn., announces that his company will commence production of ferromanganese at its furnace at Rockdale, Tenn. Heretofore the furnace has been producing ferrophosphorus. Manganese ore required for the production of the ferromanganese is being shipped to the furnace.

British Auto Output Is Limited to 20%

LONDON—The government and British automobile manufacturers have reached an agreement that approximately one-fifth of the United Kingdom's normal private automobile production will go on during the war—so that the makers shall not lose their markets.

Idle British Stacks Ordered Blown In

LONDON—British steel makers are being requested to reopen all closed blast furnaces without delay. They have been warned that it may not be possible to continue supplies of pig iron, and that they must be prepared to make a substantial proportion of their own at an early date.

Order Lifts Steel Prices in Britain

LONDON—An order fixing new prices for iron and steel products in the United Kingdom has just been made by Leslie Burgin, British Minister of Supply. The order advances steel prices on the basis of £1 per ton for billets.

The prices in operation before the war for the main range of products had been stabilized by the British Iron and Steel Federation with the approval of the Import Duties Advisory Committee until Oct. 31, and they were continued at their pre-war level by the original order made by the Minister of Supply dated Sept. 1 and the Control of Iron and Steel (No. 2) order dated Sept. 22. Prices have, therefore, been held stable since the beginning of this year in spite of many increases in raw materials, especially in recent months. The new prices take account of the increased costs of the principal imported raw materials, including the higher freight rates now in operation.

Steel "Mats" Used on African Landing Field

PRE-FABRICATED steel grid sections, which when assembled cling like a mat to uneven ground and smooth out small indentations, have been used successfully as landing surfaces for airplanes in West Africa, according to the September issue of *Iscor News*, monthly publication of the South African Iron & Steel Industrial Corp., Pretoria, South Africa.



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Emergency Taxes for National Defense May Meet With Opposition in Congress

WASHINGTON — President Roosevelt's gingerly tossed suggestion of an "emergency" tax to aid in financing a record national defense program estimated at \$2,250,000,000, has created a stir in political circles. The President was careful to avoid any commitment. Instead he has left to the American people to determine whether an increase of \$500,000,000 in the forthcoming national defense program should be financed by borrowing or by a pay-as-you-go plan.

Paying-as-you-go is something novel for the present Administration but its unprecedented spending spree having forced the national debt almost to the \$45,000,000 limit, it apparently is driven toward a realistic attitude respecting Government costs that heretofore have been lightly disregarded. At the same time the suggestion of a pay-as-you-go plan to finance the increase in the gigantic national defense program was clearly projected in the nature of a trial balloon, which can be hauled down if reaction from the country is unfavorable.

The suggestion also was so warily set forth that responsibility for such taxation is thrown into the lap of Congress, with the Administration merely cast in the role of offering the idea. Accepted or disregarded by Congress, the Administration is left in a safe spot, or, if the proposal went over big, the Administration could grab the credit. The President, however, in using a press conference at Warm Springs, Ga., as a sounding board for his suggestion, said that it was one of principle rather than of politics.

Outside political circles it is the common view that the President would have done better had he boldly come out for a pay-as-you-go plan. Its soundness is widely accepted as a matter of course. The only criticism heard points to the past with the observation that the pay-as-you-go plan should have been adopted long ago to meet huge appropriations, replacing continual deficit financing of a Federal debt that has been increased by some \$25,000,000,000 in less than seven years. Had such a plan been put into practice, it is pointed out that the appropriations and debt would not have been nearly so large, and the political effect would have been different.

Despite the soundness of the pay-as-you-go plan, however, there is serious

doubt that Congress, equally as politically sensitive as the Administration, will adopt it at the forthcoming session which convenes in January. A national election is just around the corner and, with few exceptions, Congress has never boosted taxes in a campaign year. Nor is the Administration expected to whip the tentative suggestion into a flat recommendation. The upshot, therefore, promises to be more borrowing, in the face of close approach to the debt limit, to push through an increased armament program for the fiscal year 1941, supplementing the current national defense budget total of \$1,760,000,000.

The need of a much expanded armament program is widely recognized in view of the serious international situation and possibly the required appropriation will be provided without any great opposition. But the inevitable taxation necessary, it is believed, will be held off until after the November elections.

Just what the nature of the increased taxes will be when they do come is a question. Already, however, opinion is beginning to crystallize that, despite their unpopularity, new income taxes may be levied, hitting corporations and individuals now subjected to taxation. Also, while the Administration and a majority in Congress now strongly oppose broadening the base of taxation and lowering exemptions, there is a growing belief

that these alternatives may have to be accepted, though possibly as a last resort.

Treasury Opposes War Profits Taxes

At least for the present, the Treasury Department is standing out against so-called war profits taxes because of the apprehension that they would halt recovery and therefore cut down tax revenues from a swelling national income. But "war" profits taxes are scheduled for substantial taxation ultimately as indicated by the fact that Prof. Carl Shoup of Columbia University is making a study of "war" taxes of all kinds along with a research into other forms of taxation.

Meanwhile, the Administration again is engaged in talk about Government economy. Reports are given out that the budget is to be pared sharply. The President has said that fiscal advisers are planning to cut the budgetary deficit by more than half, or by at least \$1,000,000,000 in the fiscal year's excess of expenditures over revenues. But until this has been done rather than merely promised there is a great deal of skepticism that any great economy will be effected for it is recalled that such promises frequently have been made but not fulfilled.

There certainly is no indication that the vast, sprawling, extremely expensive bureaucracy is going to be razed in the least and until that is done it is not seen how Government costs are to be slashed perceptibly. Instead of tearing it down the Administration continues to build up its multiplicity of alphabetical soup agencies with their thousands upon thousands of idlers and their heavy spending officials.

NLRB Calls Elections In Several Plants

WASHINGTON — The National Labor Relations Board has called an election to permit production and maintenance employees of the Midland Steel Products Co. pressed steel division, Detroit, to vote for the AFL's United Automobile Workers of America, the CIO's United Automobile Workers of America, or for neither.

Four separate collective bargaining elections have been called by the board for employees of Western Pipe & Steel Co., of California, South San Francisco. Employees claimed by the boilermakers' union will vote for the AFL's International Brotherhood of

Boilermakers, Iron Ship Builders, Welders and Helpers of America, Lodge No. 6 for the CIO's Steel Workers Organizing Committee, or for neither. Employees claimed by the machinists' union will vote for the AFL's International Association of Machinists Lodge No. 68, or the SWOC's Amalgamated Association of Iron, Steel and Tin Workers Union, or for neither. Employees claimed by the AFL's International Brotherhood of Electrical Workers, Local No. 617, will vote for the IBEW, for the SWOC's Amalgamated Association of Iron, Steel and Tin Workers Union, or for neither. Remaining production and maintenance employees will vote for the AFL's International Hod Carriers, Common and Building Laborers of America, Local No. 389, for the

SWOC's Amalgamated Association of Iron, Steel and Tin Workers Union, or for neither.

Board Member Edwin S. Smith concurred in the decision to hold separate elections for employees claimed by the machinists' union, citing the collective bargain-history of the IAM

and the company through the San Francisco Machine Shop Division of the California Metal Trades Association. As for employees claimed by the boilermakers' union, he dissented and recommended against holding separate elections just as he did in the Allis-Chalmers case.

FTC Complaint Against Compressed Air Group

WASHINGTON — The Federal Trade Commission has issued a complaint under the Federal Trade Commission Act charging the Compressed Air Institute, New York, and its members with entering into a combination having the effect of restricting and monopolizing trade and eliminating competition in the sale and distribution of compressed air machinery and pneumatic tools.

The commission alleges that the institute was formed with the purpose of serving as a clearing house to stabilize and supervise production and distribution; to promote standardization and improvement; to collect and disseminate among its members trade statistics and information, including prices at which products were to be sold, and to fix and maintain prices with respect to the sales of such products. The commission further charges that the respondents, through the institute, have exchanged price lists in

order to establish prices at which their products were to be sold; have fixed uniform prices, arranged for the exchange of information, established a zone system to aid in the fixing of prices and discounts, adhered to the arrangement for the fixing of prices from time to time to conform to the uniform price and discount system, "and used other methods and means designed to suppress and prevent price competition in their products."

The respondents named in the complaint are: C. Clifford Rohrbach, institute secretary and manager; Independent Pneumatic Tool Co., Chicago; Gardner-Denver Co., Quincy, Ill.; Ingersoll-Rand Co. and Chicago Pneumatic Tool Co., New York; Cleveland Pneumatic Tool Co. and Cleveland Rock Drill Co., Cleveland; Worthington Pump & Machinery Corp., Harrison, N. J., and Sullivan Machinery Co., Michigan City, Ind.

Green of AFL Opposes Prosecution of Unions Under Anti-Trust Laws

WASHINGTON — The statement by Assistant Attorney General Thurman Arnold that labor unions can be prosecuted under the anti-trust laws for certain offenses has so irked William Green, president of the American Federation of Labor, that he has asked Attorney General Frank Murphy whether the Arnold statement represents the department's attitude on the matter.

Calling it "inconceivable" that "an Administration notable for its friendliness to labor should adopt a retrogressive policy," Mr. Green said in a letter to Mr. Murphy that the Arnold interpretation is "a grave perversion of the law."

Reiterating his view that the Sher-

man Law specifically and completely exempts labor organizations, the AFL president added:

"Let me make it clear that the American Federation of Labor does not contend that illegal activities of any labor union or members or officers thereof should go unpunished. On the contrary, we urge that such offenses be prosecuted under the proper laws applicable thereto. But we do insist that the anti-trust laws cannot and must not be invoked against labor organizations because these laws themselves do not permit such prosecution. That is fundamental and unsailable."

Mr. Arnold, who had said that the department has "no choice in this mat-

ter," took a different view, insisting that union practices may become illegal where they have no reasonable connection with such "legitimate objectives" as wages, hours, safety, health and undue speeding up or the right of collective bargaining. (See THE IRON AGE for Nov. 23, page 112.)

Test Case in St. Louis

Anti-trust indictments against the AFL carpenters' union and officers of the teamsters' union in St. Louis, involving charges of violations of the law through jurisdictional strikes, already have been obtained by the Justice Department and union officers face prosecutions in other cities where charges of restraints of trade in the building field have been the subject of grand jury investigations instituted by the Justice Department.

Offering to submit a more detailed analysis of Mr. Arnold's "faulty reasoning and uninformed statements," Mr. Green took particular exception to the Arnold opinion that jurisdictional disputes can be made the subject of anti-trust prosecutions. He said the indictments already obtained by the department were taken "on the sham pretext that in calling a jurisdictional strike a union is not lawfully carrying out its legal objects."

"There are many different types of jurisdictional strikes," Mr. Green explained. "Essentially, however, they result from competition between members of two or more unions for the right to do certain work. In many cases jurisdictional disputes constitute a method of organization. Certainly no one will question the fact that organization is a primary and wholly legitimate object of a union. The American Federation of Labor believes that when jurisdictional disputes arise between unions they should be settled, if possible, by negotiation or mediation, rather than by strike action. But neither the American Federation of Labor nor any other labor organization has ever before encountered the theory that jurisdictional strikes are unlawful under the anti-trust laws."

Reeves Steel to Pay Bonuses to Employees

DOVER, Ohio—The Reeves Steel & Mfg. Co. will give its 800 employees a \$20,000 Christmas present this year. The present will be a bonus of \$25 cash to every regular employee who has been in the service of the company a year or more, the officials announced.

INDUSTRIAL NEWS FROM CANADA

Canadian Mills Soon To Announce Prices For the First Quarter

TORONTO—New business continued in good volume in the finished and semi-finished steel markets during the week and local steel interests state that practically the entire output of mills has been taken to the year end. Inquiries for first quarter are making their appearance.

Demand for steel for general domestic production has been heavy in recent weeks and is expected to continue into 1940. Officials of primary steel producing concerns are completing arrangements in Ottawa with regard to the supply of materials for war contracts and this business will add considerably to the contracts that will be closed for ordinary industrial needs.

Canadian steel mills are running at capacity in most departments, while secondary plants are stepping up operations.

Although books will open within two weeks for first quarter orders, officials of steel companies have made no announcement with regard to prices. No official changes have gone into effect with the exception of minor upward revision in sheets, and orders are still being taken with price to be announced at time of delivery.

Warehouse sheet stocks are below normal and to augment supplies there have been heavier imports from the United States.

Public Works Department, Ottawa, has announced plans for erection of two wings to general post office at Montreal, to cost \$1,000,000, for which about 1500 tons of structural steel will be required. Disher Steel Construction Co. has contract for 500 tons of steel for factory at Toronto for Acme Paper Box Co. Truscon Steel Co. of Canada, Ltd., Toronto, has contract for 300 tons of reinforcing steel for exchange building for Bell Telephone Co. of Canada, Ltd., at Kitchener, Ont. Some 500 tons of structural steel is pending for hotel at Ste. Marguerite, Que., for Alpine Inn.

Industrial Expansion

Canada Motor Products, Ltd., has acquired factory building at Dufferin and Van Horne Streets, Toronto, Ont., which will be equipped for manufac-

turing purposes. The company is affiliated with Parts Specialties, Ltd., and Dominion Bearings, Ltd., which also will have quarters in the building for manufacture and distribution of automotive parts, etc.

McColl Frontenac Oil Co., Toronto, Ont., will start work immediately on construction of a series of refining units at Cherry and Commissioner Streets to cost \$300,000.

Acme Paper Box Co., Ltd., 388 Carlaw Avenue, Toronto, Ont., has awarded general contract to Bradford & Hoshal, 1170 Yonge Street, and steel contract to Disher Steel Construction Co., 80 Commissioner Street, for construction of paper board factory to cost \$100,000. T. H. Stevens, 358 Carlaw Avenue, is engineer.

Ingersoll Machine Co., King Street, W., Ingersoll, Ont., has started work on erection of plant addition one story, 100 by 175 ft. A. Wilson, manager, will purchase materials and equipment.

Roy Hayman, 848 Dufferin Street, has general contract for erection of \$40,000 plant addition on Princess Street for Taylor Electric Co., 526 Adelaide Street, London, Ont.

Additional contracts have been awarded in connection with \$20,000 machine shop for A. E. Whitehouse, 976 St. George Street, Montreal, Que. Equipment to be purchased.

Bathurst Power & Paper Co., Bathurst, N. B., has started work on a \$400,000 plant addition which is expected to be completed by next April. R. L. Weldon, president, stated that the company embarked upon an enlargement program in 1936 to cost \$2,000,000 and the \$400,000 unit now under way will complete the undertaking.

War Supply Board To Be Enlarged

OTTAWA—By order in council passed Nov. 24 jurisdiction over the War Supply Board is transferred from Finance Minister Ralston to Transport Minister Howe. It also was announced that operations of the War Supply Board will be made known to the public instead of waiting until Parliament meets for the tabling of contracts.

Announcement also is made that enlargement of the War Supply Board from three to five members may be-

come effective within the next week or 10 days. Wallace R. Campbell now is assisted by R. C. Vaughan, as deputy chairman, and C. E. Gravel, representing Quebec. It is proposed to appoint a member to the board to represent the four Western provinces and another for the Maritimes.

All indications are that certain negotiations preliminary to placement of war contracts are now in the final stages. The Empire air pilot training scheme will be wound up almost any day. Representatives of Britain, Canada, New Zealand and Australia, have reached agreement on financial arrangements, which were the major problem, and only formal approval by the governments concerned is awaited. In general the plan involves division of costs among the various governments, and with this allotment plan is correlated arrangements on trade to provide necessary exchange facilities.

Announcement of awarding of large munitions, shells, guns, ship and airplane contracts are expected within the next few days. Canadian industry is ready to handle war contracts and only is waiting for the orders to commence production on a wide scale. It is stated that with regard to the shipbuilding program, present operating yards on the St. Lawrence and in the Maritimes will be used at the outset, although if the war is continued for any number of years, plants on the Great Lakes will be put in shape for shipbuilding.

Canada Planning on Three-Year War

OTTAWA—Finance Minister Ralston in an address delivered on Friday night stated that Canada is planning for a three-year war, and the Federal Government has estimated the Dominion's effort would cost \$315,000,000 for the first year or about 50 per cent more than the Canadian costs up to March, 1916, in the last war.

The Finance Minister stated that the War Supply Board since Sept. 1 has contracted for or is negotiating for about \$25,000,000 worth of supplies and defense projects in Canada; about \$9,000,000 worth of special equipment from Great Britain and about \$10,000,000, mostly for airplanes and component parts from the United States.

Gadsden, Ala., Is Host to Republic Steel Corp. Officials

By C. E. WRIGHT

Managing Editor, *The Iron Age*

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GADSDEN, Ala., which next year will observe the 100th anniversary of its founding and which for a greater part of that time has been an iron and steel manufacturing center, was host on Tuesday, Nov. 21, to officials of the Republic Steel Corp., which acquired a few years ago the second largest steel plant in the South, that of the former Gulf States Steel Corp.

R. J. Wysor, president; Charles M. White, vice-president in charge of operations, and Pierce F. Boyer, comptroller, of Republic, were the guests of the Gadsden Chamber of Commerce at lunch following an inspection trip through the Republic plant. Included in the party on the inspection trip and at the luncheon were business men, municipal officials and newspaper men from Gadsden and other Alabama cities and from other Southern cities as far away as Atlanta, Ga., and Chattanooga, Tenn.

Republic Steel Corp. officials, other than those mentioned, who were present included: W. J. Harper, combustion engineer, Cleveland; J. L. Hyland, Chicago district operating manager, and C. L. Bransford, Birmingham district operating manager, and the following heads of the Gadsden plant: E. I. Evans, district manager; A. G. Delany, assistant district manager; J. C. Bailey, works accountant; G. W. Philips, director of public relations; D. W. Mitchell, manager order department; R. E. Brakeman, chief engineer; R. H. Crawford, industrial engineer; S. F. Anders, chief metallurgist; H. T. Watts, combustion engineer; L. G. Shores, secretary to district manager; W. J. Ballantyne, superintendent of open hearth; F. F. Beckert, superintendent of sheet mill; H. M. Carr, superintendent of wire and rod mills; J. A. Cox, electrical superintendent; G. H. Davis, mechanical superintendent; J. O. Edwards, manager of the industrial store; A. E. Giblin, masonry superintendent; J. N. Jones, superintendent of plate and blooming mills; D. W. Jordan, superintendent of bolt and nut department; W. G. Little, superintendent of transportation; P. R. Moffett, superintendent of bar mill; M. E. Morgan, su-

perintendent of blast furnace and by-product plant. A. H. Philpot, superintendent of schedule and shipping department; A. E. Pratt, superintendent of roll department; J. D. Rodgers, superintendent of Truscon department; T. B. Rushing, storekeeper; M. E. Trammel, manager of safety department.

Improvements Completed

The occasion for this special observance was the completion of improvements which Republic Steel has had under way at the Gadsden plant for some time. Since Republic acquired Gulf States Steel in 1937 the capacity of the open-hearth plant has been increased more than 40 per cent to 47,500 tons a month, the capacity of sheet mills has been increased 28 per cent to 9000 tons a month, the plate mill has been completely overhauled and widened to roll plates 106 in. wide (the widest made in the South), a bolt and nut manufacturing department has been installed, with capacity of 1000 tons a month, machines have been installed for the manufacture of Truscon electric welded wire mesh, and other improvements have been made, including a new office building.

In his address to the luncheon gathering, R. J. Wysor, president, said that further plant improvements are planned for the near future, although he gave no details as to their character.

Prefacing his remarks with some historical references, Mr. Wysor said that charcoal pig iron was made in crude furnaces about 25 miles from Gadsden as early as the 1860's, some of this iron having been shipped to Rome, Ga., and made into Confederate cannons and cannon balls. In 1883 the first blast furnace at Gadsden was built, and from that time on Gadsden has been an iron and steel manufacturing center.

The former Republic Iron & Steel

Co. became interested in the development of the iron and steel industry in the South as early as 1899, when it purchased substantial properties in Alabama, which consisted of the Birmingham Rolling Mill Co., the Alabama Rolling Mill Co. and the Pioneer Iron & Mfg. Co. The last named, the forerunner of the present Pioneer blast furnaces of Republic near Birmingham, had built a blast furnace as early as 1866.

Predicts Steady Southern Expansion

"Republic's belief in the industrial future of the South," said Mr. Wysor, "is based on tangible realities. We are witnessing today the transition of the South's economy from one that was chiefly agricultural to one that is increasingly industrial. Not only is there a growing diversification of crops, but there is a steady diversification and expansion of industry. That is taking place not only in steel but in textiles, in paper manufacture and in many other lines.

"All this means a rising standard of living in the South over the years. At the present time and for some years it has been evident that the rate of industrial expansion has been relatively more rapid in the South than in the North."

With the expansion of the Gadsden plant, Mr. Wysor said, has come an increase in employment, the mills there now employing nearly 4000 workers or about 1200 than were employed when Republic took over the property about two and a half years ago.

Discussing the present steel situation and the outlook for the future, Mr. Wysor said that the war has been a factor in the recent sharp rise in orders and production, but only indirectly. He added that there has been no large expansion of exports for war purposes.

"If the war were to end suddenly," he said, "business would be confronted with new uncertainties, but the forces of recovery which were at work before hostilities started should not be wiped out by peace.

"New orders for steel have declined substantially from the peak of Sep-

tember and October, but they are still at a high level. Then they were far in excess of the industry's ability to deliver and, in fact, deliveries are still behind.

Good Backlogs for New Year

"From present indications the industry will enter the new year with a good backlog of orders and it seems probable that any slackening in domestic demand may be taken up by export business. Based on business in hand and in prospect, I expect activities in the steel industry to hold at good levels through the first quarter of 1940.

"The serious aspect of the steel industry has been its inability to earn adequate profits over the past 10 years. It is true, of course, that these were years of depression, but the average rate of return upon capitalization in the industry has been much lower than that for many other important industries. That has been due to the increase in wages, taxes and other costs of making steel combined with the depressed level of steel prices.

"At present the industry is faced with costs that have soared higher since the war in Europe started. Economies from higher operations are helping to meet these cost advances, but the industry generally needs better prices for some of its products to enable it to earn a fair profit.

"Whether or not the industry can continue to attract the necessary capital required for its expansion program will depend upon the demonstration of its power to earn a reasonable profit in the years ahead."

Congressman Joe Starnes of Alabama, a member of the Dies committee, related incidents of the investigation of subversive influences in the United States. His conclusion was that, of all un-American activities, those of the Communists are most to be feared.

Brief talks were also made by Charles M. White, vice-president, and E. I. Evans, district manager, who emphasized the fact that every employee of the Gadsden plant is an American citizen.

Fiber Glass in 49 Industries

TOLEDO—Fiber glass introduced in 1931 now is included in 3600 manufacturing and raw material specifications involving 565 products in 49 industries, according to H. G. Boeschstein, president of Owens-Corning Fiberglass Corp.

Southerners Form Raw Material Ass'n

THE Southern Blast Furnace and Raw Materials Association held its first formal meeting recently at the Thomas Jefferson Hotel in Birmingham. C. L. Bransford, district manager of the Republic Steel Corp., and the association's first president, was host to the group at an informal gathering before a "Dutch treat" dinner.

Principal speaker was J. E. Urquhart, general manager of the Woodward Iron Co., who described the recent air conditioning installation on one of his company's furnaces. Considerable discussion followed Mr. Urquhart's interesting and complete portrayal of this pioneering development in blast furnace practice.

In his remarks, Mr. Bransford traced briefly the history of the society. He pointed out that since the Chicago district and the Eastern States Blast Furnace and Coke associations have served a useful purpose in the industry for many years, it was fitting and proper that there should be a similar organization in the South. However, as the district around Birmingham furnishes all the raw materials necessary for the production of pig iron, this new society includes not only blast furnace and coke oven operators, but also ore and coal miners who are interested in furnishing the raw materials needed in the manufacture of this product.

The association has over 80 members, although so far it has limited its membership strictly to operators in the Southern district. It is expected that this membership will be considerably increased.

Officers of the society are: C. L. Bransford, president; J. E. Urquhart, vice-president; Francis Crockard, secretary-treasurer; G. M. Harris, C. S. Lawson, Fred Osborne, J. M. Spearman, A. G. Overton, Ben Davis, directors.

Joint Meeting of A.F.A. and S.A.E. at Detroit

DETROIT—A joint meeting of the American Foundrymen's Association and the Society of Automotive Engineers, Detroit Section, will be held at Hotel Statler, Detroit, on Dec. 4. The subject, "Relationship Between Hardness, Microstructure and Wear of Cylinder Bores and Rings,"

will be the result of research on the part of E. K. Smith, Electro Metallurgical Co., and P. S. Lane, of the Koppers Co., American Hammered Piston Ring Division.

Chile Expects Germany to Ship Railroad Equipment

WASHINGTON—A report made public by the Commerce Department last week said that Chile still expects Germany to deliver a \$4,320,000 order for railroad equipment consisting of 11 electric trains, five diesel-electric trains, three electric locomotives, and other equipment and replacement stock.

Qualifying the report as "still subject to confirmation," the announcement said that a decree issued late in September authorized the Chilean State Railways to increase the contract signed in 1937 with Ferrostaal A. G., of Essen, Germany, by \$320,000 to cover German price increases and to augment the order for repair parts and maintenance equipment.

The first deliveries are expected to be made in January, 1940, with others to follow in March and June, according to the report.

Alabama Power Co. to Spend \$6,165,000 in 1940

BIRMINGHAM—The Alabama Power Co., through Thomas W. Martin, president, has announced a construction program calling for the expenditure of \$6,165,000 during 1940.

Wean Engineering to Make Corrugated Inner Covers

WARREN, Ohio—The Wean Engineering Co., Inc., has been licensed by the American Rolling Mill Co. to have manufactured and sell corrugated inner covers under United States patents Nos. 2,069,768, 2,074,093, 2,078,718 and 2,105,750; Canadian patents Nos. 367,066, 369,348 and 367,067, and other pending United States and Canadian patent applications.

Consideration is being given to having various fabricators in the United States and Canada do the manufacturing for the Wean Engineering Co., Inc., under this license, but no contract arrangements have been concluded yet.

... THE NEWS IN BRIEF ...

Chrysler labor negotiations now center on question of status of foremen. . . . Company claims foremen are representatives of management.—Page 50.

Volume of automobile orders still large . . . Production last week only moderately affected by holiday.—Page 52.

Truck manufacturers receive large orders from United States Army.—Page 52.

President Roosevelt awaits results of his request for greater development of steel industry on West Coast.—Page 54.

U. S. census to yield complete data on steel producing and consuming industries.—Page 58.

Pressure from Secretary Ickes may force higher prices for soft coal consumers.—Page 60.

Die and tool makers under provisions of Fair Labor Standards Act.—Page 60.

Navy Department makes awards for planers, anchors, other equipment.—Page 60.

Government awards for iron and steel products for week ended Nov. 18 total \$1,448,567.—Page 60.

Berted Foundry Co., Columbiana, Ohio, purchases Akron company.—Page 61.

"Natural recovery" is the chief cause of the business upturn, E. G. Grace says in letter to Bethlehem Steel Co. employees.—Page 61.

Order lifts steel prices in Britain.—Page 62.

Steel grid sections used as landing surfaces for planes on South African field.—Page 62.

Decatur Casting Co. holds an open house for employees and the public at its foundry in Decatur, Ind.—Page 62.

Tennessee Products Corp. to make ferromanganese at Rockdale, Tenn., furnace.—Page 62.

British steel makers are urged by the Government to operate all idle blast furnaces.—Page 62.

British automobile manufacturers to make private cars at one-fifth of normal output.—Page 62.

National Labor Relations Board calls collective bargaining elections in several metal-working plants.—Page 63.

President Roosevelt's pay-as-you-go proposal for national defense may meet with opposition in Congress.—Page 63.

William Green, president of AFL, opposes prosecution of unions under anti-trust laws as proposed by Assistant Attorney General Arnold.—Page 64.

Federal Trade Commission issues complaint against Compressed Air Institute and its members for alleged restriction of competition.—Page 64.

Reeves Steel & Mfg. Co., Dover, Ohio, will give its 800 employees \$25 bonuses.—Page 64.

Canadian steel mills soon to announce prices for first quarter.—Page 65.

Canadian War Supply Board to be enlarged . . . Announcement of war contracts expected soon.—Page 65.

Canada planning on a three-year war, says Finance Minister Ralston.—Page 65.

Gadsden, Ala., Chamber of Commerce is host to Republic Steel Corp. officials on occasion of completion of improvements at Republic's plant there.—Page 66.

Fiber Glass introduced in 1931 is being used in 49 industries.—Page 67.

Wean Engineering Co. to make corrugated inner covers under American Rolling Mill Co. patents.—Page 67.

Alabama Power Co. to spend \$6,165,000 for construction in 1940.—Page 67.

Southern Blast Furnace and Raw Materials Association, a new organization, now has 80 members.—Page 67.

Joint meeting of A.F.A. and S.A.E. at Detroit.—Page 67.

Chile expects Germany to deliver railroad equipment ordered before outbreak of war.—Page 67.

St. Louis-Southwestern's 1940 budget provides \$211,333 for machinery.—Page 72.

J. A. Fisher to head Philadelphia Steel Club.—Page 72.

Winners of Metal Show torch weight guessing contest are announced.—Page 72.

October contracts for fabricated structural steel below same month in 1938.—Page 72.

Navy awards armor plate contracts totaling \$12,283,824. . . . Large Army contracts also awarded.—Page 74.

E. T. Weir says New Deal "theories" and big Government spending are obstacles to sound business recovery.—Page 73.

F. D. Newbury, economist of Westinghouse Electric & Mfg. Co. sees good industrial activity through 1940.—Page 72.

Pittman resolution involving scrap embargo to be revived in Congress.—Page 59.

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MEETINGS

Dec. 4 to 8—American Society of Mechanical Engineers, Philadelphia.

Machining bearing housings on No. 3 Jones & Lamson Ram Type Turret Lathe.



Production increased 50%

ON A NO. 3 JONES & LAMSON TURRET LATHE USING CARBIDE TIPPED TOOLS

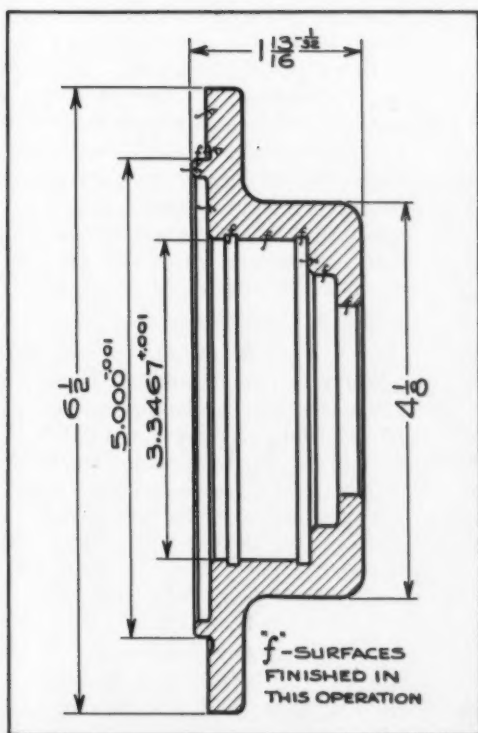
NUMBER 3 Jones & Lamson Universal Ram Type Turret Lathes are built with the extra rigidity necessary for using carbide tooling. This fact, together with speeds up to 1500 RPM, with a constant speed, $7\frac{1}{2}$ HP motor, has meant a 50% increase in production for the manufacturer of the cast iron bearing housing illustrated in the drawing.

Jones & Lamson Turret Lathes have also been designed with an eye to the future development of carbide tools. This development will not, therefore, make Jones & Lamson Turret Lathes prematurely obsolete. This is your guarantee of sustained profits over many years.

Our Engineering Department is prepared to give the latest data on machines and tooling that will increase your profits. Recommendations from blueprints or samples will be made without obligation. Why not write —

JONES & LAMSON MACHINE COMPANY SPRINGFIELD, VERMONT, U. S. A.

Manufacturers of: Ram and Saddle Type Universal Turret Lathes—Fay Automatic Lathes—Automatic Double-End Milling and Centering Machines—Automatic Thread Grinding Machines—Comparators—Tangent and Radial, Stationary and Revolving Dies and Die Chasers.



PERSONALS

FRANK C. FARRELL, formerly assistant district manager of the Central Alloy district of Republic Steel Corp., has been appointed district manager in the Buffalo district.

GEORGE W. PUTNAM, who has been assistant district manager of the Warren district, succeeds Mr. Farrell in the Central Alloy district.

J. H. GRAFT, formerly superintendent of the electrical department of the Youngstown district, becomes assistant district manager in the Warren district and J. M. ASHLEY, who has been his assistant at YOUNGSTOWN, succeeds Mr. Graft as superintendent of the electrical department.

Mr. Farrell entered the steel industry in 1903, and worked for Carnegie-Illinois Steel Corp. and Youngstown Sheet & Tube Co. He remained with the latter until 1928, resigning as general superintendent to become assistant general manager of Steel & Tubes, Inc., Cleveland. In May, 1937, he was made assistant district manager at Warren for Republic and in November, 1937, he became assistant district manager of the Central district.

Mr. Putnam joined Republic in 1933, having been superintendent of American Rolling Mill Co.'s open hearth department at Butler. He was a flying instructor during the World War and from 1919 to 1921 was a rim designer for Goodyear Tire & Rubber Co.

Mr. Graft was employed for three years at the West Penn Power Co. and for the next three years at the Standard Mines of the H. C. Frick Coke Co. Following this he spent 16 years at the Campbell works of Youngstown Sheet & Tube Co., seven years as electrical superintendent. He joined Republic Steel Corp. early in 1936 as superintendent of the electrical department of the Youngstown district.

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H. OLIVER WEST has been named special assistant to T. G. JOHNSON, president of Boeing Aircraft Co. Mr. West has long been recognized as a production expert in the aircraft industry with which he has been connected for the past 18 years. He will assist Mr. Johnson in connection with problems of plant organization and facilities which arise from present enlarged production requirements. Mr. West first joined the Boeing company in 1921 as an inspector of raw materials. Several months later he was

transferred to the company's production department where he became production chief. In 1929 he was made assistant in the executive offices of Boeing Air Transport, Pacific Air Transport and Varney Air Lines, predecessor of United Air Lines. In 1931 he was delegated to reorganize and unify the mechanical facilities of the air line group. From 1933 to 1937 he was superintendent of engineering



WARDEN F. WILSON whose appointment as general manager of sales, Lebanon Steel Foundry, was announced in these columns last week.

of United Air Lines in charge of all mechanical phases, including research and the overhaul factory at Cheyenne. During the last two years he has assisted in the formation of Trans-Canada Air Lines as technical adviser in charge of ground organization and maintenance. His task was the equipping of the Trans-Canada Air Lines with complete overhaul and maintenance shops and hiring, training and organizing the necessary mechanical personnel.

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HENRY D. PHILLIPS, formerly of the Dodge Steel Co., Philadelphia, has been made product engineer of the Lebanon Steel Foundry, Lebanon, Pa. Mr. Phillips has been associated with the steel casting industry since leaving the University of Pennsylvania in 1928, having been identified with

Stockham Pipe Fittings Co., Birmingham, as steel foundry superintendent and later with the Dodge Steel Co. as chief metallurgist and general superintendent.

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C. W. SCHEFER has been appointed purchasing agent for A. Milne & Co., New York.

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J. A. SIEGEL, first-national president of the American Society of Tool Engineers in 1932, and formerly with Packard Motor Car Co. in various capacities as tool standards engineer, assistant chief tool designer and chassis process supervisor, is now with Leland-Gifford Co., Worcester, Mass., in its Detroit office in a sales engineering capacity.

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W. HOMER HARTZ, president, Morden Frog & Crossing Works, Chicago Heights, Ill., has been renominated for president of the Illinois Manufacturers' Association. The election will be held following the 42nd annual dinner of the association, Dec. 12, at the Stevens Hotel, Chicago. Other nominations for officers and directors of the association are as follows: first vice-president, ROBERT M. GAYLORD, Ingersoll Milling Machine Co., Rockford, Ill.; second vice-president, O. M. BURTON, Burton-Dixie Corp., Chicago; treasurer, STERLING MORTON, Morton Salt Co., Chicago.

Among the directors elected are B. J. AITCHISON, Fansteel Metallurgical Corp., North Chicago; W. L. COOPER, Florence Stove Co., Kankakee, Ill.; W. I. JONES, Farrell Mfg. Co., Joliet, Ill.; ALFRED KAUFFMANN, Link-Belt Co., Chicago; R. F. RUCKER, Aluminum Ore Co., East St. Louis, Ill.; A. M. SHELDON, Union Special Machine Co., Chicago; A. J. WILSON, General Time Instruments Corp., LaSalle, Ill.; W. M. WOOD, Mississippi Valley Structural Steel Co., Decatur, Ill., and L. G. SEVER, Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill.

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JAMES T. BARNARD has been appointed to the Cleveland sales staff of the Pittsburgh Crucible Steel Co., Pittsburgh. He will make his headquarters in the Terminal Tower Building. For several years he has been in the operating department at Midland, Pa., and in the general sales office in Pittsburgh.

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J. F. JOYCE, of the Electric Auto-Lite Co., has been named national account manager with an office in Chicago, in the Merchandise Mart. He

formerly was Mid-East division manager of the merchandising division. R. E. BEHLAN succeeds Mr. Joyce as Mid-East manager and will be located at 902 Jefferson Building, Philadelphia.

KARL LANDGREBE, vice-president of the Tennessee Coal, Iron and Railroad Co.; C. E. IRELAND, president of the Birmingham Slag Co., and J. W. PORTER, president of the Alabama By-Products Corp., have been elected directors of the Birmingham Chamber of Commerce.

E. C. BARRINGER, executive secretary of the Institute of Scrap Iron and Steel, was the featured speaker at the meeting of the Cincinnati chapter of the Institute, the past week. New officers were elected as follows: HENRY B. ISRAEL, of Israel Brothers, Dayton, Ohio, president; BEN SCHOTTENFELS, David-Joseph Co., Cincinnati, vice-president; ROBERT RUDY, of Sumner & Co., Columbus, secretary-treasurer.

HERMAN FALK, president and founder of the Falk Corp., was honored Nov. 28 at a banquet given by about 60 employees who have been with the firm 30 or more years. Also attending were various members of the Falk family, including his brother, GEN. OTTO H. FALK, board chairman of Allis-Chalmers, and a vice-president of the Falk Corp. Mr. Falk observed his 73rd birthday on the following day.

M. LOEFER, Western Foundry Co., Chicago, spoke on "Melting Practice" at the Wisconsin chapter of the American Foundrymen's Association meeting in Milwaukee Nov. 17. Also discussing this subject was F. G. SCHEIBER, Whiting Corp., Harvey, Ill.; B. J. AAMODT, National Malleable & Steel Casting Co., Chicago, and H. M. ST. JOHN, Crane Co., Chicago.

MAX W. BABB, president, Allis-Chalmers Mfg. Co., Milwaukee, was re-elected director of the Federal Reserve Bank of Chicago.

W. H. BLACKMER, of Larchmont, N. Y., has been appointed sales engineer in the New England and Metropolitan New York area for the John S. Barnes Corp., Rockford, Ill.

ARTHUR R. ELSEA, a recent graduate of Ohio State University, has joined the research staff of Battelle

Memorial Institute. He will assist in a fundamental study of cast iron metallurgy.

GEORGE J. CONNELLY, formerly division superintendent of the Packard Motor Co., has been appointed production manager and chief engineer of Covered Wagon Co., Mount Clemens, Mich. He has served as a production executive and body engineer for more than 20 years, having been identified with Hupmobile, Weymann Body Co. and Murray Body Co.

GUS GILLERMAN, of Gus Gillerman Iron & Metal Co., St. Louis, has been elected president of the St. Louis chapter of the Institute of Scrap Iron and Steel. CLARENCE C. COHEN, of

I. J. Cohen & Co., Kansas City, has been elected first vice-president; HYMAN COHEN, of Standard Steel & Rail Co., St. Louis, second vice-president, and ABE P. ASHNER, St. Louis, third vice-president.

ISRAEL CITRON, of the Citron-Byer Co., Trenton, N. J., has been elected president of the New Jersey chapter of the Institute. IRVING I. WERBLIN, of Werblin Brothers, Somerville, N. J., has been elected first vice-president; HARRY WISCHE, of Lowenstein Brothers, Inc., Newark, second vice-president; IRVING FELDMAN, of P. Feldman & Sons, Inc., Elizabeth, N. J., third vice-president. ELIE BUSSELL, of Plainfield Iron & Metal Co., Plainfield, N. J., has been elected treasurer.

... OBITUARY ...

ALOIS TRAUDT, president and treasurer of the Milwaukee Lead Works, Milwaukee manufacturer of lead products for municipal water works, plumbing, died at a Milwaukee hospital Nov. 16. He had been head of the firm for 15 years. He was 62 years old.

JOSEPH WILHELM, vice-president of the Acme Stamping & Mfg. Co., Pittsburgh, died on Oct. 23.

CLEMENT RUEGG, 59, chief diesel engineer and designer at the Nordberg Mfg. Co., Milwaukee, died at his home, Nov. 9, following a six weeks' illness. He had been associated with Nordberg since 1916 and in 1917 designed their first diesel engine. Since then all details of stationary Diesel engines at the plant have passed through his hands. He was born at Fischenthal, Switzerland, coming to this country about 1912.

JOSEPH A. WAGNER, for many years with the Detroit office of the Brown & Sharpe Co., died Nov. 18 in Chicago. He recently completed 36 years of service with the Brown & Sharpe organization in service and sales capacities at Providence, Chicago, Cleveland and Detroit.

JAMES W. MORGAN, secretary-treasurer of the Brainard Steel Co., Warren, Ohio, died Nov. 21 at his home after an illness which followed a heart attack. Mr. Morgan was born in Toledo, April 23, 1892. He went to Warren 17 years ago from Youngs-

town to become secretary-treasurer of Brainard Steel.

CLARENCE W. SPICER, vice-president, Spicer Mfg. Corp., Toledo, Ohio, and a former president of the Society of Automotive Engineers, died in Miami, Fla., Nov. 21, of heart disease. He had been in Miami two weeks. He was 63 years old.

EDWARD F. ERDMAN, former supervisor for the Allyne-Ryan Foundry Co., Cleveland, died Nov. 22, aged 73 years.

WALLACE I. STIMPSON, vice-president and chairman of the board of directors of the Draper Corp., Hopedale, Mass., died on Nov. 22. Mr. Stimpson was associated with the company for half a century and contributed materially in inventions to the development and improvement of Northrop looms. He was born in Hopedale, Mass., 75 years ago.

FRANK T. WENTWORTH, retired manufacturing superintendent of the United Shoe Machinery Corp., Beverly, Mass., plant, died on Nov. 22. Mr. Wentworth was born in Kenduskeag, Me., 70 years ago, was formerly associated with the Draper Corp. in Hopedale, Mass., and Walworth Mfg. Co. in Boston, and in 1891 the Consolidated Hand-Method Lasting Machine Co., which later became affiliated with the United Shoe Machinery Corp. He was made manufacturing superintendent of the Beverly plant in 1901, and since his retirement five years ago was a consulting engineer for the company.

St. Louis-Southwestern's 1940 Budget Provides \$211,333 For Machinery

ST. LOUIS—The 1940 budget of the St. Louis Southwestern Railway provides for the expenditure of \$211,333 for shop machinery. The program as filed in the United States District Court here has been set down for hearing before Judge Davis on Dec. 15. The items listed and their estimated cost include the following:

1—Drill press	\$1,150
1—No. 3 universal milling machine	10,000
1—Heavy duty 3-ft. radial drill..	6,250
1—12-in. turret lathe with taper bolt turning attachment	8,000
1—16 x 48-in. engine lathe	4,450
1—20-in. vertical drill press	1,430
1—Nipple cutter	650
1—Barnes No. 242 drill press	3,200
1—Davis cutter grinding machine	860
1—Oliver or similar make drill pointer	855
1—5-hp. heavy duty floor grinder	745
1—Journal turning and quartering machine	32,556
1—6-ft. American radial drill ...	13,170
1—Universal cutter and tool grinder	2,730
1—Planer	4,270
2—Motor driven emery wheels ...	790
1—Steam hammer	13,750
1—Upsetting machine for draw bars	3,350
1—400-lb. hammer for tool dressing	3,420
1—2½-in. forging machine	22,600
1—800-lb. motor-driven air hammer	6,200
1—Magnaflux inspection outfit...	3,200
1—200-amp. electric welder	1,100
1—300-amp. electric welder	690
1—300-amp. Wilson or similar make electric welding machine	660
1—Punch and shear	6,500
1—Power bending rolls	1,070
3—½-ton jib cranes with electric hoist	1,930
1—Electric hoist for Travograph machine	650
1—1-ton jib crane with electric hoist	770
3—½-ton capacity electric hoists.	750
1—5-ton capacity air motor hoist	793
1—Towmotor industrial truck ...	1,637
1—Portable lift truck with skids.	3,540
6—Air-operated 50-ton jacks ...	3,370
2—50-ton air-operated jacks ...	1,060
4—35-in. journal jacks	222
2—75 to 100-ton air-operated jacks	1,211
Blowers	2,440
2—3-hp. motors with independent fans	555
1—7½-hp. motor and independent fan	480

Other items on the list include small tools to the value of \$8,680 and \$3,250 for portable electrical tools for the bridge and building department.

October Structural Orders Below Same Month in 1938

NEW business booked by the structural steel fabricating industry in October was slightly more than the monthly average this year, according to the final reports received by the American Institute of Steel

Is This Some Sort Of a Record?

THE 1940 budget of the St. Louis-Southwestern Railway states that it will retire and scrap one 79-in. driving wheel lathe purchased in 1860, just 79 years ago. Furthermore, according to railroad accounting methods, the road is credited with \$2,893 by this retirement.

Construction. While this new business during October was smaller than it was for the same month last year, the shipments of fabricated material during the month were larger than they were last year.

The total of new orders during the first 10 months of the current year were 50 per cent of the average total bookings for the first 10 months of the years 1923-1925 inclusive (10/12 of 2,675,000 tons), which were compiled by the U. S. Department of Commerce. The 1923-1925 base is used for comparison with the charts "Construction Contracts Awarded" currently appearing in the monthly Survey of Current Business published by the Bureau of Foreign and Domestic Commerce of the U. S. Department of Commerce, which are based on the index, 1923-1925 equals 100.

Westinghouse Economist Sees Good Activity in 1940

BOSTON—F. D. Newbury, economist of the Westinghouse Electric & Mfg. Co. and student of cyclical business fluctuations, in an address before the New England Control of the Controllers Institute of America at the University Club, last week was optimistic as to industrial activity during the next year.

He predicted a slight decline in operations of heavy industries in the next three months, but stated the reaction will be followed by renewed near peak production in the spring and early summer. He said some reduction in activity would be expected under normal conditions during the second half of 1940, but no such decline as occurred in the second half of 1937.

Reasons given for this belief included a larger volume of building contracts and larger Federal deficit expenditures, but in any event no serious decline in capital expenditures need be looked for such as the decline following 1937. Export business, with

reasonable expectations, could heighten the peak and soften the decline in 1940.

Aluminum Prices Are Unchanged

PITTSBURGH—There will be no advance in Aluminum Co. of America domestic prices for aluminum ingot during the first quarter of 1940, according to Roy A. Hunt, president of the company.

"Benefits of research and development," Mr. Hunt said, "together with expansion of plants and facilities, permit the company to expect lower costs, and, in line with its expressed policy, it intends to share such economies with the consumers of aluminum."

Mr. Hunt said the company has completed the \$26,000,000 expansion program for new plants and improvements to existing plants it announced in 1937. He stated that Aluminum Co. of America is not in favor of taking advantage of extraordinary conditions, such as those created by the present war situation, to seek prices out of harmony with costs. Mr. Hunt said that if increased cost of labor and materials necessitate an increased price he felt such increases would be justified, but he did not consider it a wise policy to raise prices merely because of an opportunity to do so.

J. A. Fisher to Head Philadelphia Steel Club

PHILADELPHIA—J. A. Fisher, district sales manager of Wheeling Steel Corp., was elected president of the Philadelphia Steel Club for 1940 at the club's annual meeting recently. Other officers elected at the meeting were: vice-president, H. E. Richardson, Youngstown Sheet & Tube Co.; secretary-treasurer, R. H. McCracken, Central Iron & Steel Co., and directors, C. H. Stoeckle, Crucible Steel Co. of America, and H. W. Merriman, Alan Wood Steel Co.

Rego Weight Contest Winners

WINNERS of the Bastian-Blessing Co.'s torch weight guessing contests at the Metal Show in Chicago last month were Richard Brown, of the J. Marsh Construction Co., Chicago; C. C. Horton, Barber Greene Co., Aurora, Ill.; Richard Reed, Screw Conveyor Co., Hammond, Ind.; Sam Bretto, Illinois Clay Products Co., Joliet, Ill., and C. Wilms, W. D. Allen Mfg. Co., Chicago.

New Deal "Theories" and Big Spending Curb Sound Recovery, Says E. T. Weir

DETROIT — Development of sound economic recovery in the United States is prevented by Government spending and the effect of New Deal "theories" on business, it was stated in an address here Nov. 27 by Ernest T. Weir, chairman of National Steel Corp. and president of the American Iron and Steel Institute. Mr. Weir spoke before The Economic Club of Detroit at a noon meeting in the Book Cadillac Hotel.

The speaker characterized the present business situation as unsound despite the current high rate of activity because, he said, the stimulation has come largely from anticipation of war buying from Europe. Permanent recovery, the steel leader pointed out, depends upon a sustained high volume of private investment in productive enterprise.

The poor earnings experience of American business firms has shut this investment off in recent years, Mr. Weir said, by depriving business organizations of the funds which they normally reinvest in plant and equipment and also by destroying the incentive which attracts the savings of investors.

Heavy taxation plus the disruption of business by new regulation and controls of Government are directly responsible for business losses and low profits, the speaker contended.

As an example of the adverse effect of Government "theory" on industry, Mr. Weir cited the Wagner Act and its administration under the National Labor Relations Board. Referring to the Chrysler strike, the steel leader said:

"Your city of Detroit has reason to be keenly aware of the effect of this theory in the vital field of employer-employee relationships. Today the form and spirit of those relationships are established by the Wagner Act—a law that was deliberately made one-sided and therefore unfair—a law that was constructed on the theory that there is a necessary antagonism between employer and employee. The fact is that employers and employees have a great natural community of interest. They have every incentive to cooperate rather than to fight each other. Yet this natural will to cooperate has been nullified throughout industry by the Wagner law, whose inherent one-sidedness and injustice have been made

many times worse by the vicious administration of the Labor Board."

Mr. Weir stated that instead of eliminating strikes, the Wagner Act and its administration by the Labor Board have been major factors in producing the greatest period of labor disturbance in the history of the country.

"No natural disaster can equal the destructive effect of continuing labor dissension," he said. "San Francisco had its earthquake, Chicago its fire, Galveston its tidal wave and Pittsburgh its flood. Yet in each of these communities hardly had the catastrophe passed before men were rebuilding on the ruins. They were acts of Providence beyond the control of man. But labor dissension is man-made. Prudent men will no more build enterprises in communities that become notorious for labor strife than they will build on a possible battleground of warring armies. Communities grow, improve themselves, increase their opportunities for employment and raise their standards of living by harmony, not warfare."

Since 1940 is an election year, Mr. Weir predicted the National Administration at Washington will neither reduce spending nor increase taxes to produce revenue sufficient to cover the spending. Instead an effort will be made to increase the national income to the point where the present rate of taxation will produce a much higher federal income. For this reason, he said, "experiments are being soft-pedaled; mysterious submarines have taken the place of economic royalists as threats to the national welfare, and, according to Washington observers, plans are being made to give business a 'shot in the arm' if there is any sign of contraction in the present rate of business activity."

The question of national income is at the heart of our domestic problems, the speaker stated, and whether we have a high or low national income depends on the extent to which wants and needs are converted into demands for goods and services.

"America has plenty of wants and needs," Mr. Weir continued, "enough and more to employ every last person able and willing to work, enough to utilize every bit of our productive capacity and any conceivable expansion of that capacity. In my opinion, to

say that a ninety billion dollar national income is attainable for America is notable understatement. With our resources, our man power, our technical skill, and a population that wants and is willing to work for a steadily improving standard of living, we should be able to produce more than ninety billion, not just in a few exceptional years, but in practically every year.

"But we will not attain this goal," he said, "unless the American economic system is free to accomplish again as it did during the first century and a half of our history. And right at this point is where the economic theories of the latter-day idealists clash with the facts of business as business men know them."

There is not a phase of business which is not in some way affected by artificial handicaps, Mr. Weir said. He pointed out that only business men who are in daily contact with governmental experimentation know in detail how it has multiplied the difficulties of business and destroyed its incentives. The results, however, may be plainly seen by anyone who cares to look at them.

"There is an absurd contradiction between the main lines of economic policy that have been thrust on the country by the Government planners," the steel leader said. "With one hand they have acted to demoralize the economic system and keep it stalled at depression levels. With the other they have tried to stimulate it to prosperity activity by the device of 'pump-priming.' Government spending is powerless to overcome Government-created lack of confidence and the problems of heavy cost, complicated operation and poor profit in business today. In this, despite twenty billions of pump-priming, we have the explanation of the stop-and-start economic situation of the Roosevelt Administration."

In commenting on the European war, Mr. Weir said that the country can be thankful for the lull in war emotion and war talk in the United States. He cautioned, however, that extremely active war in Europe would create the danger of war hysteria here.

"Let us profit by experience," he said, "and remember that while the country was solidly for neutrality as late as November, 1916, American troops were on the march April, 1917.

We must not let that happen again."

In conclusion, the steel leader urged his business men listeners to work at the job of spreading understanding of our basic economic problems.

"Business men are expected to be aware of the influences affecting national economic well being, to warn against that which is harmful, to advocate that which is well advised," he

said. "It is our obligation to make it understood that our important problems are domestic problems and that these problems must be solved in line with time-honored principles."

Navy Awards Armor Plate Contracts; Large Lettings By War Department

WASHINGTON—The Navy Department has awarded contracts for armor plate totaling \$12,283,824 to three companies as follows: Bethlehem Steel Co., \$4,855,610; Carnegie-Illinois Steel Corp., \$3,436,335; Midvale Co., \$3,991,879.

War Department Awards

Awards announced by the War Department's Ordnance Division for the two-week period ending Nov. 15 totaled \$3,567,227. Contracts were awarded to these companies:

Under the artillery ammunition program—Midvale Co., Philadelphia, ammunition, \$757,500; Bethlehem Steel Co., Bethlehem, Pa., ammunition, \$1,060,000; Dollin Corp., Irvington, N. J., base block castings for parachute flares, \$1,859; Mount Vernon (N. Y.) Die Casting Corp., ammunition parts, \$9,152.

Under the artillery material program—Spencer Lens Co., Buffalo, telescopes with spare parts, \$70,693; Bethlehem Steel Co., Bethlehem, forgings for gun tubes, \$61,535; Read Machinery Co., York, Pa., mortars and mounts, \$187,830.

Under the small arms ammunition program—Remington Arms Co., Inc., Bridgeport, Conn., ammunition, \$952,350.

Under the rehabilitation machinery program—Lodge & Shipley Machine Tool Co., Cincinnati, lathes with accessories, \$6,538; Warner & Swasey, Cleveland, turret lathes, \$35,315; Joseph T. Ryerson & Son, Inc., Chicago, shear and punch, \$3,950; Onsrud Machine Works, Inc., Chicago, boring and routing machinery, \$11,792; Michigan Tool Co., Detroit, universal eccentric relieving machine, \$8,265; Pratt & Whitney Division, Niles Bement-Pond Co., Hartford, Conn., profilers, high speed, \$50,390; Stedfast & Roulston, Boston, boring mills, \$55,548; Henry Prentiss Co., New York City, boring mills, \$128,988; Kearney & Trecker Corp., milling machines, \$33,724.

Under the special machinery program—R. K. LeBlond Machinery Co.,

Cincinnati, boring center drive, double-end lathes, \$113,990.

Under the inspection gages program—Pratt & Whitney Division, Niles-Bement-Pond Co., thread gages, \$14,025.

The following companies were awarded contracts by the Air Corps:

Pittsburgh Screw & Bolt Corp., propeller blades and assemblies, \$31,650;

Sperry Gyroscope Co., Brooklyn, N. Y., indicator assemblies, \$219,537; Niles-Bement-Pond Co., Pratt & Whitney Division, Hartford, milling machines, \$2,405; Brown & Sharpe Mfg. Co., Providence, milling machines, \$18,812; Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati, milling machines, \$31,989; E. A. Kinsey Co., Cincinnati, \$31,396; C. H. Gosiger Machinery Co., Dayton, Ohio, milling machines, \$2,181.

Contracts awarded by the Quartermaster Corps included a \$307,650 order to the American Car & Foundry Co., Milton, Pa., for tank cars.

ICC Suspends Reduced Rates on Tin Plate to Texas Points

WASHINGTON—The Interstate Commerce Commission has suspended until June 25 tariffs proposing reduced rates on tin plate in carloads from points in Alabama, Illinois, Indiana and Missouri to Beaumont, Dallas, Houston and Port Arthur, Tex. The rates were proposed by Southwestern railroads and opposed by Official Classification rail carriers. It is proposed to reduce rates on tin plate, minimum 100,000 lb., to 43c. per 100 lb. from 55c. per 100 lb. from the Chicago district and to 35c. from 45c., minimum 60,000 lb., from the St. Louis and Birmingham districts.

In their petition asking that the tariffs be not reduced, Official Classification railroads said that even if as claimed by the Southwestern lines, the proposed rates were necessary because of water competition, the reason does not hold good for the rates to intermediate points. It had also been urged the reduced rates to Dallas were necessary because of competition between tin can manufacturers at that point with tin can makers in Houston and that if rates to Dallas were not reduced as proposed the Dallas industry would have to move to Houston.

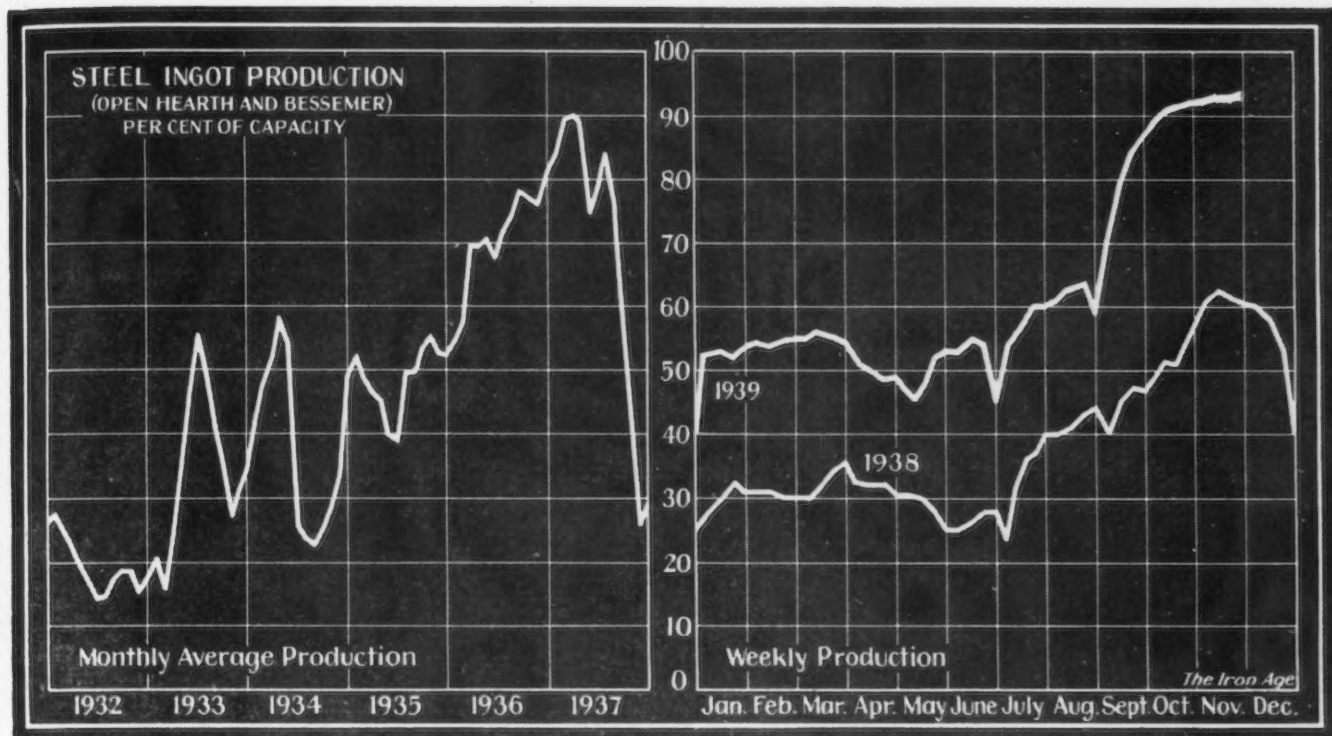
The protesting carriers pointed out that the proposed rates had general application to intermediate territory, with little limitation, and that the routes involved would permit the ap-

plication of the depressed rates to a large intermediate territory.

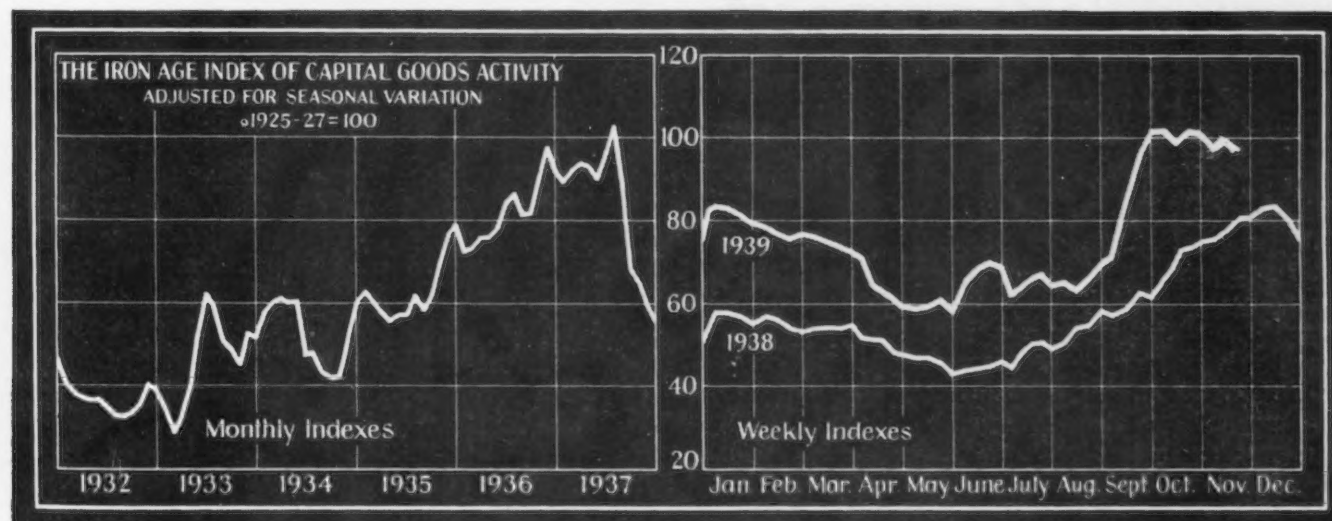
"We cannot deny the Southwestern lines the right to meet water competition between points where that competition actually exists," said the petition. "We cannot, however, subscribe to a reduction in rates such as proposed here to Dallas for the purpose of establishing a relationship with Houston. If this principle were followed throughout, the water route level of rates would become the basing rate and all other rates would be related thereto."

The petition said that Official Classification carriers already have a request for reduction in the rate on tin plate from Pittsburgh, Youngstown and other producing districts in their territory to the points involved in the Southwestern railroads' tariffs to a basis related to the proposed rates from Chicago and St. Louis. It was stated that Official Classification carriers cannot escape competitive rates with those from Chicago and St. Louis unless the rates from Chicago and St. Louis are made strictly on water competition and applied only where that competition exists.

Ingersoll-Rand Co., New York, has been awarded contracts for the condensers, condenser pumps and boiler feed pumps for a 19,405-ton, all-welded tanker to be built for the Atlantic Refining Co. at the Sun Shipyards, Chester, Pa.



District Ingot Production, Per Cent of Capacity		Pittsburgh	Chicago	Valleys	Philadelphia	Cleveland	Buffalo	Wheeling	Detroit	Southern	S. Ohio River	Western	St. Louis	East-ern	Aggre-gate
CURRENT WEEK..		94.0	94.0	93.0	90.0	88.0	97.0	93.0	91.0	86.0	82.5	90.0	84.0	95.0	94.5
PREVIOUS WEEK..		93.0	94.5	91.0	86.0	86.0	97.0	93.0	100.0	86.0	85.0	85.0	84.0	95.0	93.5



THE continued rise in the Pittsburgh component and the almost equal advance of the steel ingot production factor as a result of seasonal corrections (the rate itself remaining the same as the previous week) were not enough to offset losses in the three other components of the index of capital goods activity, resulting in a decline of almost a point in the combined index. For the past seven weeks, the index has been bumping up and down within a two point range. Largest decline was again recorded in the automobile production index, but only half the drop of the previous week. Allowing for the holiday, daily average production was practically unchanged but seasonal adjustment depressed the computed index, which is now 12 points below the 1938 index because of the continuance of the Chrysler strike. Construction awards dropped sharply for the week ended Nov. 25, largely due to holiday influences, although it is significant that private awards for the week topped those of the same week

in 1938 by 82 per cent. In point of number, forest product carloadings fell only an insignificant amount, but the adjusted figure showed a decline. Gains in both the production and the shipments factors for the Pittsburgh district sent the source factor up over three points, modified somewhat by seasonal adjustments in the final index number.

	Week Ended Nov. 25	Week Ended Nov. 18	Comparable Week	
			1938	1929
Steel ingot production ¹	140.7	138.5	95.0	99.8
Automobile production ²	84.4	89.6	96.9	60.6
Construction contracts ³	80.4	81.3	80.4	108.8
Forest products carloadings ⁴	69.5	72.5	57.5	112.9
Production and shipments, Pittsburgh District ⁵	120.1	117.5	72.3	104.7
Combined index	99.0	99.9	80.4	97.4

Sources: ¹ THE IRON AGE; ² Ward's Automotive Reports; ³ Engineering News Record; ⁴ Association of American Railroads; ⁵ University of Pittsburgh.

... SUMMARY OF THE WEEK ...

... Most steel prices are reaffirmed for first quarter.

o o o

... Advances on H.R. sheets and strip partly offset by reduced extras.

o o o

... Steel scrap sharply lower as new steel production record is attained.

COINCIDING with the attainment of a new record high level of ingot output, steel scrap prices have declined sharply, as much as \$2 at Pittsburgh, while prices on most of the major steel products have been reaffirmed for the first quarter by the Carnegie-Illinois Steel Corp., whose action has already been followed by some of the independent producers.

Carnegie-Illinois announced that its decision on prices, which has been long awaited, was made "in spite of rising costs and many uncertainties" and the company declared a desire "to cooperate in preventing inflationary tendencies." The Inland Steel Co. characterized Carnegie-Illinois' move as "constructive" and tending to "prevent runaway price levels which have accompanied other periods of abnormal activity."

EXCEPTIONS to the continuance of unchanged prices are in hot rolled sheets and hot rolled strip, which are increased \$2 a ton, but the advance on sheets is offset in the case of certain gages by a reduction of extras. Thus, on No. 23 gage and lighter hot rolled sheets the pickling extras have been reduced \$2 a ton, canceling the base price advance, while size extras for Nos. 17 and 18 gages have been reduced \$2 a ton, resulting in an unchanged net price on these gages. Single pickled hot rolled annealed sheets, Nos. 19 to 22, inclusive, are now on a price parity with mill run cold rolled sheets, correcting an anomaly in price relationship between these grades that was brought about by the continuous mill process and placing non-integrated operators of hand mills in better competitive position. An additional price change is an advance of \$2 a ton on cold rolled sheets in coils of 12 in. and wider and a corresponding increase in hot rolled annealed and pickled sheets in coils, Nos. 19 to 22 gages, inclusive.

An announcement of the tin plate price for the first quarter is looked for this week. No change is expected nor is any increase believed to be in prospect on other products not yet covered by price announcements, including wire rods, plain wire, cold

rolled strip, cold finished steel bars, bolts, nuts and rivets, pipe and pig iron.

As the changes announced on hot flat rolled products undoubtedly will govern on any business that might be taken for delivery over the remainder of this year, they have been applied to THE IRON AGE finished steel composite price, which has risen to 2.261c. a lb., the first change in this average since May.

A DECLINE of \$2 in the Pittsburgh quotation for No. 1 heavy melting steel and one of \$1 at Philadelphia have reduced THE IRON AGE scrap composite price \$1 to \$18.58, a total decline of \$3.92 from the peak of \$22.50 in the first week of October. The price drop at Pittsburgh was brought about by mill purchases and brokers' offers at lower figures. In other districts all grades of scrap are weak. This is partly the result, perhaps, of the knowledge that recent reports of large export sales were greatly exaggerated. Other factors tending to depress scrap prices are increased production of scrap as a result of greater industrial activity, heavy movement of scrap out of hiding, and continued lack of consumer interest due to the approaching inventory period and a desire for better appraisal of first quarter steel operating prospects.

There is a leveling off in new steel business, which may be accentuated by the fact that shipments of some products can be deferred until after Jan. 1, if customers desire, without loss in view of unchanged prices. Such deferment is already occurring in tin plate and may extend to some other products in cases where users have sufficiently protected themselves on inventory for the next 60 days. Nevertheless, there is still a substantial flow of new business, mainly for first quarter, and, while steel inventories are being built up in many instances to requirements of at least three months, the volume of steel that is going directly into consumption is greater than seems to be generally realized.

WHILE the steel industry does not expect the current record-breaking production to continue for very long, there is still no indication of a sharp drop either before the end of the year or in the early part of the first quarter. This week's total output of ingots will be approximately 1,292,000 tons compared with an average of 1,217,567 tons in October and the pre-depression record weekly average of 1,193,284 tons in May, 1929, while the November total will be about 5,470,000 tons compared with 5,393,821 tons in October, a longer month, and with 5,286,246 tons in May, 1929, the previous record month.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

	Nov. 28, 1939	Nov. 21, 1939	Oct. 31, 1939	Nov. 29, *1938
<i>Per Gross Ton:</i>				
Rails, heavy, at mill	\$40.00	\$40.00	\$40.00	\$40.00
Light rails: Pittsburgh, Chi- cago, Birmingham	40.00	40.00	40.00	40.00
Rerolling billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Bir- mingham, Sparrows Point.	34.00	34.00	34.00	34.00
Sheet bars: Pittsburgh, Chi- cago, Cleveland, Youngs- town, Buffalo, Canton, Sparrows Point	34.00	34.00	34.00	34.00
Slabs: Pittsburgh, Chicago, Gary, Cleveland, Youngs- town, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	34.00
Forging billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Bir- mingham	40.00	40.00	40.00	40.00
Wire rods: Nos. 4 and 5, Pittsburgh, Chicago, Cleve- land	43.00	43.00	43.00	43.00
Skelp, grvd. steel: Pittsburgh, Chicago, Youngstown, Coatesville, Sparrows Point, cents per lb.	1.90	1.90	1.90	1.90

Finished Steel

<i>Cents Per Lb.:</i>				
Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.15	2.15	2.15	2.25
Plates: Pittsburgh, Chicago, Gary, Birmingham, Spar- rows Point, Cleveland, Youngstown, Coatesville, Claymont	2.10	2.10	2.10	2.10
Structural shapes: Pittsburgh, Chicago, Gary, Buffalo, Bethlehem, Birmingham ..	2.10	2.10	2.10	2.10
Cold finished bars: Pitts- burgh, Buffalo, Cleveland, Chicago, Gary	2.65	2.65	2.65	2.70
Alloy bars: Pittsburgh, Chi- cago, Buffalo, Bethlehem, Massillon or Canton	2.70	2.70	2.70	2.80
Hot rolled strip: Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown, Birmingham	2.10	2.00	2.00	2.15
Cold rolled strip: Pittsburgh, Cleveland, Youngstown ...	2.80	2.80	2.80	2.95
Sheets, galv., No. 24: Pitts- burgh, Gary, Sparrows Point, Buffalo, Middletown, Youngstown, Birmingham..	3.50	3.50	3.50	3.50
Hot rolled sheets: Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown...	2.10	2.00	2.00	2.15
Cold rolled sheets: Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown ...	3.05	3.05	3.05	3.20

Nov. 28, Nov. 21, Oct. 31, Nov. 29,
1939 1939 1939 *1938

Cents Per Lb.:

Wire nails: Pittsburgh, Chi- cago, Cleveland, Birming- ham	2.55	2.55	2.55	2.45
Plain wire: Pittsburgh, Chi- cago, Cleveland, Birming- ham	2.60	2.60	2.60	2.60
Barbed wire, galv.: Pitts- burgh, Chicago, Cleveland, Birmingham	†3.40	3.40	3.40	3.20
Tin plate, 100 lb. base box: Pittsburgh and Gary	\$5.00	\$5.00	\$5.00	\$5.00

*Pittsburgh prices only.

†Applies to 80-rod spools only.

‡Subject to post-season adjustment.

Pig Iron

<i>Per Gross Ton:</i>				
No. 2 fdy., Philadelphia ...	\$24.84	\$24.84	\$24.84	\$22.84
No. 2, Valley furnace	23.00	23.00	23.00	21.00
No. 2, Southern Cin'tl	23.06	23.06	23.06	21.06
No. 2, Birmingham	19.38	19.38	19.38	17.38
No. 2, foundry, Chicago† ...	23.00	23.00	23.00	21.00
Basic, del'd eastern Pa.	24.34	24.34	24.34	22.34
Basic, Valley furnace	22.50	22.50	22.50	20.50
Malleable, Chicago†	23.00	23.00	23.00	21.00
Malleable, Valley	23.00	23.00	23.00	21.00
L. S. charcoal, Chicago ...	30.34	30.34	30.34	28.34
Ferromanganese, seab'd car- lots	100.00	100.00	100.00	92.50

†The switching charge for delivery to foundries in the Chi-
cago district is 60c. per ton.

Scrap

<i>Per Gross Ton:</i>				
Heavy melting steel, P'gh...	\$18.75	\$20.75	\$22.50	\$15.75
Heavy melting steel, Phila...	19.75	20.75	21.75	14.75
Heavy melting steel, Ch'go...	17.25	17.25	18.625	14.25
Carwheels, Chicago	16.50	16.50	17.75	12.75
Carwheels, Philadelphia	21.25	21.25	22.25	16.75
No. 1 cast, Pittsburgh	19.75	20.75	22.75	15.50
No. 1 cast, Philadelphia	21.75	22.25	24.25	16.75
No. 1 cast, Ch'go (net ton)...	15.00	15.00	16.25	12.50

Coke, Connellsville

<i>Per Net Ton at Oven:</i>				
Furnace coke, prompt	\$5.00	\$5.00	\$5.00	\$3.75
Foundry coke, prompt	5.75	5.75	5.75	4.75

Non-Ferrous Metals

<i>Cents per Lb. to Large Buyers:</i>				
Copper, Electrolytic, Conn...	12.50	12.50	12.50	11.25
Copper, Lake, New York...	12.50	12.50	12.50	11.375
Tin (Straits), New York...	**54.50	**52.00	**55.50	45.90
Zinc, East St. Louis	6.50	6.50	6.50	4.50
Zinc, New York	6.89	6.89	6.89	5.14
Lead, St. Louis	5.35	5.35	5.35	4.85
Lead, New York	5.50	5.50	5.50	5.10
Antimony (Asiatic), N. Y...	16.50	16.50	16.50	14.00

**Nominal.

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

Finished Steel

Nov. 28, 1939	2.261c. a Lb.
One week ago	2.236
One month ago	2.236
One year ago	2.286

Based on steel bars, beams,
tank plates, wire, rails, black
pipe, sheets and hot-rolled strip.
These products represent 85 per
cent of the United States output.

	HIGH		LOW
1939.....	2.286c., Jan. 3;	3.	2.236c., May 16
1938.....	2.512c., May 17;	17.	2.211c., Oct. 18
1937.....	2.512c., Mar. 9;	9.	2.249c., Jan. 4
1936.....	2.249c., Dec. 28;	28.	2.016c., Mar. 10
1935.....	2.062c., Oct. 1;	1.	2.056c., Jan. 8
1934.....	2.118c., Apr. 24;	24.	1.945c., Jan. 2
1933.....	1.953c., Oct. 3;	3.	1.792c., May 2
1932.....	1.915c., Sept. 6;	6.	1.870c., Mar. 15
1931.....	1.981c., Jan. 13;	13.	1.883c., Dec. 29
1930.....	2.192c., Jan. 7;	7.	1.962c., Dec. 9
1929.....	2.223c., Apr. 2;	2.	2.192c., Oct. 29
1928.....	2.192c., Dec. 11;	11.	2.142c., July 10

Pig Iron

		\$22.61 a Gross Ton	
		22.61	
		22.61	
		20.61	
Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.			
HIGH		LOW	
\$22.61, Sept. 19;		\$20.61, Sept. 12	
23.25, June 21;		19.61, July 6	
23.25, Mar. 9;		20.25, Feb. 16	
19.73, Nov. 24;		18.73, Aug. 11	
18.84, Nov. 5;		17.83, May 14	
17.90, May 1;		16.90, Jan. 27	
16.90, Dec. 5;		13.56, Jan. 3	
14.81, Jan. 5;		13.56, Dec. 6	
15.90, Jan. 6;		14.79, Dec. 15	
18.21, Jan. 7;		15.90, Dec. 16	
18.71, May 14;		18.21, Dec. 17	
18.59, Nov. 27;		17.04, July 24	

Steel Scrap

		\$18.58 a Gross Ton	
		19.58	
		20.96	
		14.92	
Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.			
HIGH		LOW	
\$22.50, Oct.	3:	\$14.08, May	16
15.00, Nov.	22:	11.00, June	7
21.92, Mar.	30:	12.92, Nov.	10
17.75, Dec.	21:	12.67, June	9
13.42, Dec.	10:	10.33, Apr.	29
13.00, Mar.	13:	9.50, Sept.	25
12.25, Aug.	8:	6.75, Jan.	3
8.50, Jan.	12:	6.43, July	5
11.33, Jan.	6:	8.50, Dec.	29
15.00, Feb.	18:	11.25, Dec.	9
17.58, Jan.	29:	14.08, Dec.	3
16.50, Dec.	31:	13.08, July	9

THIS WEEK'S MARKET NEWS

PRICES

. . . Carnegie-Illinois reaffirms prices on most products . . . Hot rolled sheets and strip up \$2 a ton

THE long-awaited announcement of first quarter steel prices was issued by the Carnegie-Illinois Steel Corp. on Tuesday. The announcement as given to the press was as follows:

"In spite of rising costs and many uncertainties, the Carnegie-Illinois Steel Corp., desiring to cooperate in preventing inflationary tendencies, announced today (Nov. 28) reaffirmation of its present prices on rerolled blooms, billets and slabs, sheet bars, forging blooms, carbon and alloy bars, structural shapes, steel sheet piling, rails, plates, electrical sheets, vitrenamel and galvanized sheets, long terme sheets, black plate and cold rolled sheets, for shipment to and including March 31, 1940, for delivery and consumption within the United States.

"In order to bring about a better relationship between hot rolled sheets and cold rolled sheets, some extras applicable to hot rolled sheets, including certain pickling extras, have been revised downward, while the base prices of hot rolled sheets and hot rolled strip have been revised to \$2.125 per 100 lb., base, delivered Pittsburgh; and \$2.13 per 100 lb., base, delivered Chicago.

"Announcement of tin plate prices will follow within a few days.

"This announcement states that the prices apply only on such shipments as are made up to and including March 31, 1940, and that any shipments after that date will be invoiced at the prices in effect at the date of shipment."

The reaffirmation of prices on a majority of steel products will tend to further stabilize steel markets and relieve whatever price tension has existed recently. The upward revision of \$2 a ton on hot rolled sheets and hot rolled strip, designed to bring about a better alinement between certain gages of hot rolled single pickled annealed and mill run cold rolled sheets, has been modified to some extent by changes in extras. Pickling extras on 23 gage and lighter, hot rolled annealed sheets, have been re-

duced \$2 a ton, thus canceling the \$2 a ton advance in the base price as it affects these particular gages. However, single pickled hot rolled annealed sheets, gages 19 to 22 inclusive, are now on a price parity with similar gages of mill run cold rolled sheets, thus cleaning up a situation which was the outgrowth of the evolution of the continuous hot strip mill and, of course, eliminating overgrading in these particular gages. In order to maintain a differential between mill run cold rolled sheets and single pickled hot rolled annealed sheets, gages 17 and 18, size extras for these grades have been reduced \$2 a ton, thus voiding the \$2 base advance in hot rolled sheets and retaining for the continuous mill a market for single pickled hot rolled annealed sheets in these two regularly used sizes.

Additional revisions in sheet prices have been a \$2 a ton advance on all cold rolled sheets in coils of 12 in. and wider and a corresponding increase in hot rolled annealed and pickled sheets in coils, gages 19 to 22 inclusive. This revision has been made to take care of handling costs in the mill involving cold sheets sold in coil form.

In taking action similar to that of Carnegie-Illinois Steel Corp., P. D. Block, president of Inland Steel Co., CHICAGO, said that he regarded Carnegie's move as very constructive, and that it should be helpful in preserving healthy business conditions and in preventing runaway price levels which have accompanied other periods of abnormal activity.

Products on which prices are still to be announced include tin plate, pipe, cold finished bars, wire products, cold rolled strip, bolts, nuts and rivets, and pig iron. No price advances are expected on any of these products. The tin plate price announcement is expected this week. The American Steel & Wire Co. probably will make an announcement on wire products and cold rolled strip within a day or two.

In pig iron circles it is believed that the reaffirmation of steel prices and the continued weakness in scrap prices effectually dispose of any possibility of an advance in pig iron prices for the first quarter.

Recent export orders booked by EASTERN PENNSYLVANIA plate mills were at prices ranging from 2.45c. to 2.55c. per lb., f.a.s., as compared with the 2.70c. basis prevailing in October and early November.

A producer of cold finished carbon and alloy bars at Pittsburgh has announced that until further notice the present prices on these products will be reaffirmed on orders received for shipment up to and including March 31, 1940.

NEW BUSINESS

. . . Leveling off in buying but backlogs are substantial

FRESH steel orders at PITTSBURGH in the past week have leveled off further but, when coupled with incoming specifications against previous commitments, the aggregate is substantial enough to prevent any material change in total steel backlogs. Headway is being made on pipe, sheet and strip backlogs but unfilled orders on bars, semi-finished and wire are virtually unchanged from a week ago. A moderate paring down of backlogs, however, is expected to materialize in the next month and headway should be made in January and February, thus suggesting a slow but nonetheless actual decline in ingot output during the latter part of the first quarter and the beginning of the second quarter. In view of the unprecedented operations, such a tendency is entirely logical.

After a dip at Thanksgiving, new steel business is irregularly better at both CLEVELAND and YOUNGSTOWN. Incoming tonnage up to Nov. 25 in hot rolled strip and sheets, wire rods, and small size merchant bars was only a few thousand tons below the volume in the corresponding part of October. Very little additional tonnage can be accepted for first quarter by some mills in the above named items.

CHICAGO steel sellers do not expect the first quarter price reaffirmation to alter greatly the rate at which new orders are being received. The current need for steel has been, and is, such as to minimize the importance of price as compared with delivery. Even the \$2 a ton increase in hot rolled

sheets and strip will probably mean little as concerns the volume of orders, since no mill has for some weeks been able to accept further sheet business for this year. Many customers already have placed their first quarter requirements on the books, but those who have not yet done so are not believed to have been waiting for a price announcement.

Of the business coming into CHICAGO offices today, probably not less than 80 per cent consists of fresh orders, as contrasted with specifications against commitments. Virtually all of the latter should be in mills' hands by the end of this month. Tonnage being entered today is at the rate of around 70 per cent of capacity in the case of one large mill in CHICAGO, but this rate is expected to be nearer 50 per cent at the year end. This decline may be explained as normal expectation following three months of tremendous buying activity.

It is certain, however, that many buyers have not yet ordered their entire first quarter needs, and that considerable tonnage can still be booked, even though certain products at some mills, are already scheduled through March. As has been pointed out before from CHICAGO, the steel for fully 30,000 railroad cars which are to be constructed in early 1940, is yet to be placed.

New bookings in the PHILADELPHIA area in the past week showed a further slackening, but pressure for shipments of material on order continued unabated. Most sales offices in that area have accepted commitments for practically all their allotted first quarter tonnage of sheets, strip and bars, and delivery of any of these items before early March is practically impossible. Galvanized sheets are especially tight. Outside of the warehouses, some clean-up railroad lots and several cargo boats, there is very little large new business in sight. Plate deliveries of larger producers have been shortened considerably recently and are now reported to be only two to three weeks beyond that of the smaller Eastern Pennsylvania mills. Recent large Government armor plate awards are instrumental in sustaining the district's high rate of operations. Export demand in PHILADELPHIA continues very light, with prices on the soft side.

In NEW YORK new business during November has been at good volume, though possibly not quite equaling the October rate. One effect of the probable reaffirmation of tin plate prices will be to hold back some releases for

rolling of tin plate this year. In sheets and strip, however, no letup is expected until low-priced business now on the books is completed. Some sheet users would like to buy additional tonnage for delivery this year at the prices that were announced for the fourth quarter.

SAN FRANCISCO water front is still tied up by a CIO ship clerks' strike and steel shipment by water has been blocked. No settlement is in sight.

STEEL OPERATIONS

... Ingot rate for industry rises another point to 94½%

THE ingot production rate for the steel industry has risen another point this week to 94½ per cent for the industry.

Operations in the PITTSBURGH district have advanced one point this week to 94 per cent of ingot capacity, while the WHEELING-WEIRTON district is unchanged at 93 per cent. Continued fluctuations are expected but with mills straining equipment in order to move as much tonnage as possible by the end of the year, higher than current rates are likely in the near future.

CHICAGO district mills are operating this week at 94 per cent of capacity, down one-half point from a week ago.

Output is larger in both the CLEVELAND-LORAIN and YOUNGSTOWN districts. The rate for YOUNGSTOWN and nearby cities is up two points to 93 per cent, and for CLEVELAND-LORAIN up two points to 88 per cent.

Recent lighting of several additional furnaces has brought the number of mills in EASTERN PENNSYLVANIA that are operating at 100 per cent of practical capacity up to four and has raised the district's rate to 90 per cent, a gain of four points over the previous week. In at least two cases, however, the lighting of additional furnaces was in anticipation of the shutting down of others for repairs.

Ingot-production at BUFFALO stands today at 95 per cent. Bethlehem's Lackawanna plant continues with 30 furnaces active, Republic with eight, and Wickwire-Spencer with three.

At BIRMINGHAM 20 open hearths were operated last week; 20 are scheduled for this week.

Production in SOUTHERN OHIO has dropped two and a half points to 82½ per cent. There are now 26 out of 33

open hearths in operation, the latest reduction having been made in the Portsmouth unit of the Wheeling Steel Corp., where six out of 10 open hearths are now in operation as against seven out of 10 a week ago. Current reduction in production is due to a need for repair on furnaces with the possibility of reheating open hearths in several units during the current week or during the next week.

The DETROIT rate, which has been 100 per cent for some time, is down to 91 per cent this week. Ford Motor Co. has taken off a furnace and one is off at Great Lakes Steel Corp. for repairs. An increase is expected next week.

PIG IRON

*... No change in prices expected
... Shipments are heavy*

With reaffirmation of prices on major steel products, it is believed that there will be no change in pig iron prices, but so far no producer has made an announcement.

With shipments holding up strong, producers' inventories at CLEVELAND and YOUNGSTOWN continue to decline despite the large number of stacks in blast. Foundries continue very active with the exception of those catering to the Chrysler plants. Foundry coke shipments, however, are a poor indicator at present, being off from last month due to coverage before the price advance.

November shipments to date in the CHICAGO area are slightly ahead of a month ago, while foundry coke continues to move at capacity. Iron taken at \$21 will be shipped throughout this quarter, of course, but spot business at \$23 has not been infrequent.

Pressure for shipment from PHILADELPHIA consumers eased slightly in the past week, but volume of deliveries is still close to capacity for most merchant producers. November shipments by PHILADELPHIA sellers run from 5 to 10 per cent above October and for some interests were the heaviest on record. Consumption is still on a high level and continues to expand. Inventories, however, are still considered below "normal" levels. Weakness in scrap prices and reaffirmation of steel prices have ended discussions of possible higher prices for next quarter.

While the books for the first quarter have not been opened, the trade in St. LOUIS area seems to feel that

present prices will be reaffirmed for first quarter. Heavy commitments are expected to cut down first quarter buying, unless there should be some fear later that prices will advance. Shipments continue heavy.

New England foundries are going strong, but the aggregate operation has not gone above 80 to 85 per cent because of the shortage of molders. However, there are foundries operating night as well as day shifts. Buying of pig iron is practically at a standstill, while shipments against old contracts continue good. Despite the lack of buying the market is in a very healthy condition.

The NEW YORK market has reached an inactive stage. Most consumers have been well supplied with iron and new orders are very light. As yet there is little interest in first quarter iron. Soil pipe and heater line plants are seasonally off in activity, and the stove makers have let up some but not as much as in previous seasons. The machine tool melt is extremely heavy. Export business has eased off. None of the tonnages placed are large, nor are inquiries.

RAILROAD BUYING

... New purchases light ... 5000 cars still to be bought

NEW railroad purchases in the past week were very light, consisting of eight diesel-electric switchers, 11 tank cars and one car ferry. The Newburgh & South Shore ordered one switcher from American Locomotive Co. and the Erie placed three with Electro-Motive Corp. and four with American Locomotive Co. Phillips Petroleum Co. awarded 10 tank cars to American Car & Foundry Co. and one to American Transportation Corp. Pere Marquette awarded a new steel car ferry costing approximately \$1,970,000 to Manitowoc Shipbuilding Co., Manitowoc, Wis.

Current rail prices have been reaffirmed for first quarter delivery.

Close to 5000 freight cars are expected to be ordered between now and the end of the year.

The St. Louis-Southwestern Railway has filed its 1940 budget in U. S. District Court and it has been set down for hearing by Judge Davis at St. Louis for Dec. 15. The application for the expenditure of a total of \$2,087,754 for betterments and improvements includes \$243,089 for rails and \$544,948 for freight car building and

repairs previously authorized and purchased, as noted in these columns. New work includes increasing the height of 535 box cars now being repaired, \$75,612; modernizing three parlor cafe cars, \$16,500; converting one steel underframe coach and two old diners to work equipment, \$15,861. New equipment includes one 25-ton locomotive magnet crane, 50 ft. boom, with four-wheel 5½ x 10-in. trucks, \$25,250, and a 250-ton steam wrecker, \$75,000. Other items in the budget include shop machinery, \$211,333; signals and interlockers, \$231,878, shops and engine houses, \$47,293; locomotive repairs, \$44,588, and work equipment, \$139,750.

REINFORCING STEEL

... No change in prices for first quarter

PRESENT concrete bar prices will be effective throughout the first quarter of 1940, as was anticipated.

Reinforcing steel awards dropped to 2380 tons from 11,450 tons last week. The largest award was 850 tons for the Wolf Creek supply reservoir.

New reinforcing steel projects at 7590 tons were only slightly over half the 14,825 tons for last week. Most of the inquiries were for lots under 500 tons, with the exception of one for 3000 tons for a filtration plant for Toledo and one for 1500 tons for a housing project in New Haven, Conn.

While accurate figures have not yet been released, the Appraisers Building and Immigration Station, San Francisco, on which bids are to be taken Dec. 15, is believed to require between 3000 and 3500 tons of bars.

Several thousand tons will be required for the concrete graving docks at Pearl Harbor, T. H., on which bids will be taken Dec. 20.

The largest pending project in Ohio involves 3000 tons for a Toledo filtration plant, with bids due Dec. 6.

WIRE PRODUCTS

... Prices probably will be reaffirmed this week

AREFLECTION of the price policy for first quarter established in the announcement by Carnegie-Illinois Steel Corp. Tuesday is expected when wire producers announce this week. No change is expected in base prices.

New business has been brisk recently, with rod capacity for first quarter nearly sold out.

... PLATES ...

... Carnegie-Illinois reaffirms 2.10c. price for the first quarter

THE reaffirmation of the 2.10c. per lb. price on plates by the Carnegie-Illinois Steel Corp. has created a problem for those mills which recently increased their quotations \$5 a ton because of higher costs. It is understood that no decision has been arrived at as to what will be done, but the competitive situation in the first quarter probably will be the determining factor.

Shipments to car builders continue brisk from CLEVELAND and YOUNGSTOWN mills. Inquiries are good, including approximately 900 tons for tanks for the Navy and some bridge work. A new steel car ferry requiring plates and shapes and costing approximately \$1,970,000 has been awarded to Manitowoc Shipbuilding Co., Manitowoc, Wis., by Pere Marquette Railway Co. Otherwise, actual new business so far this month is reduced from the October rate, according to CLEVELAND and YOUNGSTOWN sellers but still November remains one of the best months of this year.

In CHICAGO, some mills report an increase in plate orders last week. Though plates are not scheduled far into 1940 as yet, when compared to sheets and bars, a considerable tonnage is yet to come from railroad car builders, while structural fabricators and miscellaneous consumers are expected to show continued interest.

The bulk of consumers' requirements in the PHILADELPHIA area has been spoken for and new commitments are light. New bookings by the smaller independent mills who have been quoting 2.35c., Claymont or Coatesville, are just about equal to output. Sheared plate can be shipped by these interests in two or three weeks, while the larger producers are reported as requiring from four to six weeks. This delivery period of the larger producers represents a considerable reduction from schedules prevailing a month ago and undoubtedly will have considerable influence over the activity of the independent mills quoting the higher price.

Export demand is very light and prices have declined to a range of 2.45c. to 2.55c. per lb., f.a.s., 2.70c. ruling 30 days ago. Most of the foreign inquiry now circulating in the market involves lots of from 300 to 500 tons, with very few proposals exceeding this latter figure.

STRUCTURAL STEEL

*... Base price reaffirmed ...
Fabricated awards are larger*

THE base price on structural shapes has been reaffirmed for shipment through the first quarter of 1940, with shipments after that time taking the price in effect at time of shipment.

Structural steel lettings rose sharply to 25,770 tons, compared with 9000 tons last week. Outstanding projects included 6700 tons for a turret and erection shop for the Brooklyn Navy Yard, 5300 tons for the Passaic River bridge superstructure, and 3100 tons for a grade separation project at Saginaw, Mich.

New structural projects were lower at 12,855 tons as against 18,000 tons in the previous week. Naval air station hangars call for 7500 tons, and Kentucky dam lock gates for TVA will require 2000 tons.

Bids may be called soon for the 20,000 ton Pit River bridge, Central Valley Project, Cal.

MERCHANT BARS

*... Tonnage holding up well ...
Some mills booked through February*

CURRENT quotations on hot rolled carbon and alloy bars will be effective on shipments up to and including March 31, 1940; shipments after that date will be invoiced at the price in effect at the time of shipment. Although fresh bar business at PITTSBURGH has leveled off slightly in the past few weeks, total specifications reaching the mills are still in sufficient volume to prevent any material change in backlogs. Furthermore, some plants have already earmarked bar capacity

for at least the first two months of 1940 with specifications being received rapidly to cover these reservations.

At CLEVELAND and YOUNGSTOWN bookings up to Nov. 25 were only a few thousand tons below the volume of the comparable part of October. This month is assured of being one of the best in the past two years. Production continues high. Some bar mills are still unable to get all the raw steel desired.

A fair tonnage of bars is still coming into CHICAGO sales offices, one office finding a preponderance of bars in last week's sales total. Major bar users are makers of tractors and farm implements, as usual, and producers of seamless tubing, motor trucks, and bolts, nuts and rivets.

TUBULAR GOODS

... Standard pipe sales are holding fairly well

OIL-COUNTRY goods specifications at PITTSBURGH leveled off some in the past few weeks but standard pipe sales are holding exceptionally well.

SEMI-FINISHED STEEL

... Prices reaffirmed ... Shipments are still heavy

AS expected, semi-finished steel prices have been reaffirmed by Carnegie-Illinois Steel Corp. for shipment to and including March 31, 1940. Shipments after that date will be invoiced at the price in effect at the date of shipment. Shipments at PITTSBURGH continue heavy and little or no headway has been gained in reducing backlogs.

New business is light at CLEVELAND

and YOUNGSTOWN because of producers' reluctance to undertake supplying any large additional requirements. One Middle Western mill is understood to have a 20-weeks' backlog in one size of semi-finished.

SHEETS AND STRIP

*... Hot rolled advanced \$2 a ton
... Some extras revised*

BASE prices of hot rolled sheets and hot rolled strip have been revised upward \$2 a ton, making them 2.10c. a lb., f.o.b. Pittsburgh, and some extras applicable to hot rolled sheets including certain pickling extras have been revised downward "in order to bring about a better relationship between hot rolled sheets and cold rolled sheets," according to the statement issued by Carnegie-Illinois Steel Corp. Under this new setup, and concurrent with the revision in the base price of hot rolled sheets, pickling extras on hot rolled annealed sheets, 23 gage and lighter, have been reduced from 40c. to 30c. a 100 lb., a reduction of 10c. Pickling extras on heavier than 23 gage remain the same, thus resulting in a price parity between the intermediate gages (19 to 22 inclusive) of single pickled annealed and mill run cold rolled sheets, a change which will put the price structure more in alignment with actual production practices. Another revision in line with production conditions has been a reduction of 10c. a 100 lb. in the size extra for 17 and 18-gage hot rolled sheets, which maintains a differential between hot rolled single pickled annealed and mill run cold rolled in these two gages. With 18 to 22-gage single pickled annealed sheets to be on a parity with mill run cold

(CONTINUED ON PAGE 91)

Weekly Bookings of Construction Steel

	Week Ended				Year to Date	
	Nov. 28, 1939	Nov. 21, 1939	Oct. 31, 1939	Nov. 29, 1938	1939	1938
Fabricated structural steel awards	25,770	9,000	22,600	15,315	900,795	818,865
Fabricated plate awards	2,310	575	11,460	510	177,350	119,585
Steel sheet piling awards .....	.....	0	1,270	300	74,565	43,215
Reinforcing bar awards	2,380	11,450	16,100	6,560	433,415	313,660
Total Letting of Construction Steel..	30,460	21,025	51,430	22,685	1,588,505	1,295,325

Canada's Industrialization

(CONCLUDED FROM PAGE 49)

zation has brought forth a résumé of the situation from the U. S. Department of Commerce, which concludes that the expansion produced in the Dominion by the war will depend "primarily on the intensity and duration of the conflict," a conclusion also reached by this writer after a visit to Canada and published in *THE IRON AGE* of Nov. 16, page 33.

"The Dominion's industries differ from those of the United States in both size and character," says the Department of Commerce survey. "Canada's total population at the middle of June, 1938, was estimated at 11,209,000, about a twelfth as large as ours. The total manufactured production in 1937 was about one-seventeenth as large. Some 660,000 were employed in the manufacturing plants during the year as compared with 9,786,500 in this country. The industrial concentration is heavier in the United States and per capita output is higher with respect both to the gross value of production and the value added by manufacture. An even more important difference is that to a much greater extent than in the United States the Dominion's most important lines of production are based directly on raw material resources. The largest contributor to the manufacturing census, in point of value, is now non-ferrous

metal smelting and refining. The largest industry in point of wage payments is the pulp and paper industry.

"Because of our proximity to Canada and the relative ease with which operations can be carried across the border, to get around the handicap of the Canadian tariff and the British Empire system of tariff preferentials, United States branch plants have played a leading role in the Dominion's industrial developments for many years," the Department of Commerce survey added.

U. S. Investments Welcomed

Canada welcomes the investment of United States capital in its resources and manufacturing industries. As was pointed out in a previous article, the foreign exchange control regulations have been relaxed so that foreign capital will not be shut out entirely. Capital investments will be "frozen in" during the war to the extent that only dividends and not profits from the sale of securities or plants can be taken out of the country, but, on the other hand, Canada will encourage the making of reasonable profits from wartime manufacture even though profits will be taxed for war purposes.

The World War produced a considerable industrial development in Can-

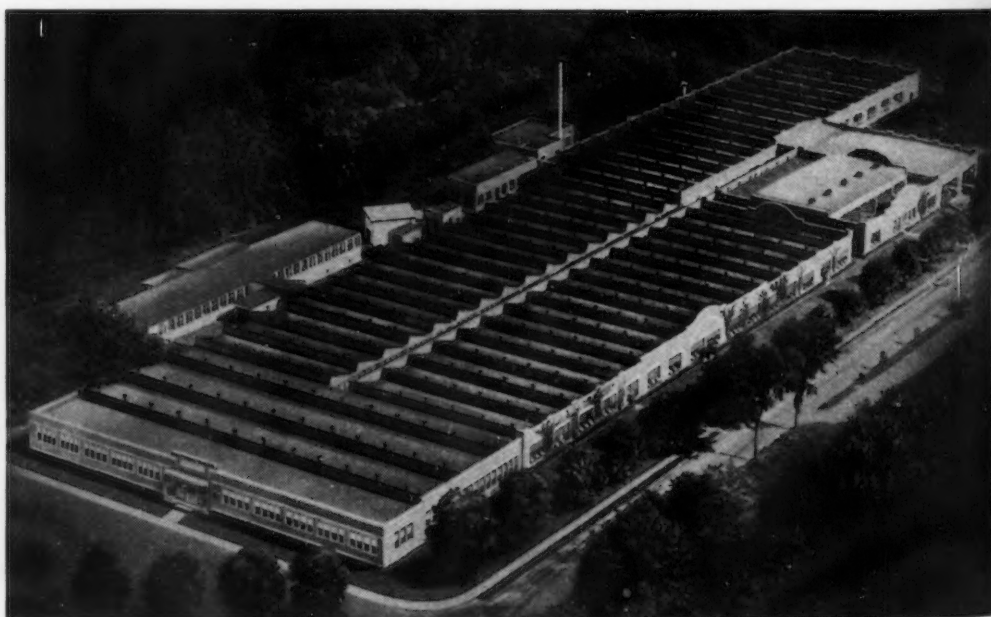
ada, and it is believed that this war may do the same, provided that the war is not disastrous in its destruction of values.

The Dominion Bureau of Statistics lists 40 manufacturing industries in Canada having a total number of 18,465 establishments as of the end of 1937. In the value of their products, the non-ferrous smelting and refining and the pulp and paper industries rank first and second respectively. In steel and steel fabricating lines, the automobile industry is top, ranking fourth among all industries in Canada. The manufacture of railroad rolling stock ranks tenth, the primary iron and steel industry thirteenth, the machinery industry seventeenth, the manufacture of sheet metal products twenty-first, manufacture of automobile supplies twenty-second, castings and forgings twenty-sixth, coke and by-products twenty-seventh, brass and copper products thirty-first.

With the addition of other industries not included in the list of the 40 most important, the number of manufacturing establishments of all kinds in Canada is 24,834, but of course this figure includes many small shops. From official sources in Canada it is learned that there are not more than 250 to 300 manufacturing plants there that can properly be regarded as of sufficient importance to be real factors in the production of equipment and munitions for war purposes.

Completed Jones & Lamson Plant

RECENT expansion of the plant of the Jones & Lamson Machine Co. at Springfield, Vt., has increased the space for production lines to a total of four and three-quarters acres. The new extension covers an area of 24,000 sq. ft. and accommodates the administrative, clerical and engineering forces.



... GREAT BRITAIN ...

... Steel works operating at a high rate ... Efforts made to increase exports

LONDON, Nov. 28 (By Cable)—Steel works here are still operating at a very high rate with priority demands claiming the bulk of the output, but efforts are now being made to increase exports, and makers are encouraged to allocate certain quantities for this purpose.

The base price on plates and angles in the Empire markets is £11 2s 6d f.o.b.

The International Coke Cartel comprising the United Kingdom, Belgium, Germany, Holland, and Poland ends March 31.

The Continent reports a strong steel demand for export and at home, but home requirements necessarily are receiving first claim.

Prices are officially unchanged, but tending higher.

Welsh tin plate demand is still being maintained with sales up to the first half. Belgian Phenix Works reports are satisfactory with tin plate working up to 8000 basis boxes daily with a full capacity of 1600 boxes output expected in two months. The whole output is to be sold for Belgian consumption.

CAST IRON PIPE

Quincy, Mass., has awarded its 1940 pipe requirements to the Warren Foundry & Pipe Corp., Boston.

Boston has placed a tonnage of 6 and 8-in. pipe with the Warren Foundry & Pipe Corp. There was a difference of only \$19 between the high and low bid.

Sunnyside, Wash., has awarded 170 tons of 6, 8, 10 and 12-in. pipe to Central Foundry Co., Birmingham, through contractor.

Standardsville, Va., plans pipe lines for water system and other waterworks installation. Cost close to \$30,000. Financing has been arranged through Federal aid.

Board of Pinellas County Commissioners, Clearwater, Fla., takes bids soon for 20,000 lin. ft., for pipe lines for extensions in county beach water system at Maderia Beach. Fund of \$70,000 has been arranged for this and other waterworks installation in area noted. S. K. Keller is engineer for board.

Board of Lower Penns Neck Township Commissioners, Pennsgrove, N. J., plans pipe lines for extensions in water system in number of streets at Pennsville. Appropriation of about \$40,700 is being arranged for this and other waterworks installation.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Dec. 6 for cast iron water mains for installation at Marine Barracks, Quantico, Va. (Specifications 9359).

Morton, Minn., closes bids Dec. 5 for about 2600 lin. ft. of 4-in., with fittings, hydrants, etc.

Water District No. 6, Jackson County, Mo., recently organized, care of Frank Rope, Fidelity Building, Kansas City, Mo., attorney and representative, plans pipe lines for water system in Marlborough district, extending from Wornall Road to Blue River. Surveys and estimates of cost are being made by Charles A. Haskins & Co., Finance Building, Kansas City, consulting engineers.

Lilesville, N. C., plans pipe lines for water system and other waterworks installation. Bond issue of \$38,000 has been voted for this and sewerage system.

Hamber, Ohio, plans pipe lines for water system. Also new 75,000-gal. elevated steel tank and tower, and other waterworks installation. Cost about \$38,000, of which \$20,000 will be a bond issue, recently voted.

Waveland, Ind., asks bids soon for pipe lines for water system and other waterworks installation, including elevated steel tank and tower, deep-well motor-driven pumping equipment, fire hydrants and other waterworks equipment. Harl Ahl, Indiana Pythian Building, Indianapolis, is consulting engineer.

Pineville, N. C., plans pipe lines for water system and other waterworks installation. Fund of \$100,000 is being arranged through Federal aid for this and sewerage system.

... PIPE LINES ...

Magnolia Pipe Line Co., Esperson Building, Houston, Tex., affiliated with Magnolia Petroleum Co., same address, has authorized immediate construction of new welded steel pipe line from oil field area at Vanderbilt, Jackson County, Tex., to Sealy, Austin County, Tex., about 85 miles, for crude oil transmission, and will carry out work with company forces. Connection will be made with main system of company at latter point. Pumping stations will be installed for booster service at points along route.

Guy L. Smith, Cut Bank, Mont., is at head of project to develop natural gas properties in vicinity of Havre, Mont., including 10-mile welded steel pipe line for gas transmission to connect with an existing pipe line system. Also will install pipe line gathering system. Financing is being concluded. J. Bland Catlett, Carrizo Springs, Tex., also is interested in project.

Louisiana-Nevada Transit Co., Cotton Valley, Webster Parish, La., has let contract to T. R. Jones, Inc., Magnolia Building, Dallas, Tex., for construction of new welded steel pipe line from gas field area at Cotton Valley to Okay, Howard County, Ark., and thence to Hope, Ark., and vicinity, totaling close to 200 miles in all, for natural gas transmission. Award for pipe has been made to Bovaird Supply Co., Thompson Building, Tulsa, Okla., on basis of about 85 miles of 8-in., 12 miles of 6-in., and remainder 4-in. and smaller. Several booster stations will be built, with control and meter stations at terminal points, and other operating facilities for local distribution. Work is scheduled to begin at once.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for pipe line system for gasoline distribution, including steel storage tanks, at naval air station, Alameda, Cal. (Specifications 9505).

Inland Empire Refineries, Inc., Spokane, Wash., is securing estimates of cost from Williams Brothers Corp., Tulsa, Okla., pipe line contractor, for proposed new welded steel

pipe line from oil field district at Cut Bank, Mont., to Spokane, for crude oil transmission to refining plant at latter place, recently noted in these columns. Line will cross Rocky Mountains and will total over 275 miles. Booster pumping stations and other operating facilities will be installed.

Valley Pipe Line Co., Alamo National Bank Building, San Antonio, Tex., has approved plans for new pipe line to connect properties in oil field districts in central and northern part of Starr County, Tex., about 25 miles. Proposed to use welded joint pressure cast iron pipe. Work will be carried out by company forces.

Chemical Warfare Service, Edgewood Arsenal, Edgewood, Md., asks bids until Dec. 4 for 3000 lin. ft. of 3-in. black steel pipe (Circular 315).

British Firm Obtains Option On Kennametal Patents

ANNOUNCEMENT has been made by the McKenna Metals Co., Latrobe, Pa., that George H. Alexander Machinery, Ltd., of Birmingham, England, has obtained an option on the McKenna patents to manufacture Kennametal in Great Britain. Kennametal is the name applied to a series of new steel-cutting carbide tool compositions made from the recently discovered intermetallic compound, tungsten-titanium carbide (W₂TiC₂). For over a year, the Alexander company has been importing Kennametal steel-cutting carbide blanks.

Arthur Alexander, who negotiated the option, is proceeding to Canada to survey the possibilities for the establishment of a Canadian factory for the production of Kennametal. His present address is 75 Cook Street, Victoria, B. C.

Cummins Engine Co. to Build New Laboratory

INDIANAPOLIS—Contracts for the design and construction of a 10,000 sq. ft. research and development laboratory for the Cummins Engine Co., Columbus, Ind., have been awarded to the Austin Co. The structure will be of welded rigid frame construction. A machine shop will be provided.

New Scrap Company In Cleveland

CLEVELAND—Jack Levand, for four years assistant manager of the Cleveland office of Summer & Co., announces the formation of Levand & Co., brokers in iron and steel scrap. The company's offices are at 518 Fidelity Building.

FABRICATED STEEL

... Lettings rise sharply to 25,770 tons from 9000 tons last week ... New projects lower at 12,855 tons, against 18,000 tons last week ... Plate call for 2310 tons.

NORTH ATLANTIC STATES AWARDS

- 6700 Tons, Brooklyn, N. Y., turret and erection shops, building No. 18, for U. S. Navy, to Bethlehem Steel Co., Bethlehem, Pa.
- 5300 Tons, Kearny, N. J., cont. No. 3, Passaic River bridge, to American Bridge Co., Pittsburgh.
- 500 Tons, Medway, Me., East Branch Penobscot bridge, to Phoenix Bridge Co., Wyman & Simpson, Inc., Augusta, Me., contractors.
- 400 Tons, Johnson City, N. Y., Willow Street grade crossing, to American Bridge Co., Pittsburgh.
- 390 Tons, Broome County, N. Y., bridge, PSC-8586, to the American Bridge Co., Pittsburgh.
- 380 Tons, Phoenix, N. Y., bridge RC-4087, to the Lackawanna Steel Construction Co., Buffalo, N. Y.
- 355 Tons, Orange County, N. Y., bridge, FAGH-RC-4084, to the American Bridge Co., Pittsburgh.
- 310 Tons, Orange County, N. Y., highway bridge, PSC-6975-6165-6865, to the American Bridge Co., Pittsburgh.
- 250 Tons, Brewster, N. Y., state bridge RC-4074 for New York, New Haven & Hartford Railroad, to American Bridge Co., Pittsburgh.
- 235 Tons, Glendale, L. I., N. Y., plant addition for Atlas Waste Mfg. Co., to the Bethlehem Steel Co., Bethlehem, Pa.
- 230 Tons, Boonton, N. J., flood channel and Passaic River bridges, to American Bridge Co., Pittsburgh.
- 200 Tons, Summit, N. J., addition to building "D," for Ciba Pharmaceutical Products Co., to Schaefer Iron Works, Edgewater, N. J.
- 175 Tons, Andover, N. Y., highway bridge, to the Bethlehem Steel Co., Buffalo.
- 150 Tons, Carteret, N. J., state bridge, to Bethlehem Steel Co., Bethlehem, Pa.
- 145 Tons, Tompkins County, N. Y., bridge, FAGH-RC-4085, to American Bridge Co., Pittsburgh.
- 100 Tons, Carney's Point, N. J., building for E. I. du Pont de Nemours & Co., to Belmont Iron Works, Philadelphia.

SOUTH AND SOUTHWEST

- 900 Tons, Maybeury, W. Va., renewal bridge 860 for the Norfolk & Western Railway, to the Virginia Bridge Co., Roanoke, Va.
- 880 Tons, Va., renewal bridges for Norfolk & Western Railway, various locations, to the Virginia Bridge Co., Roanoke, Va.
- 560 Tons, Alexandria, Va., power house for the Utility Management Corp., to Belmont Iron Works, Philadelphia.
- 455 Tons, Portsmouth, Va., turret assembly shop, to the Ingalls Iron Works, Birmingham.
- 335 Tons, State of Texas, county road work, to North Texas Iron & Steel Co., Fort Worth, Tex.
- 265 Tons, Jefferson County, Ky., bridge, to American Bridge Co., Pittsburgh.
- 165 Tons, El Paso County, Texas bridge FAGM 84-A (1), to Mosher Steel Co., Dallas, Tex.

CENTRAL STATES

- 1000 Tons, Saginaw, Mich., state grade separation bridge, to Bethlehem Steel Co., Bethlehem, Pa.
- 810 Tons, Cedar Rapids, Iowa, bridge El, to Iowa & Iron Works, Cedar Rapids.
- 185 Tons, Minneapolis, hangar, to Crown Iron Works, St. Paul.
- 165 Tons, Decatur, Ind., bridge No. 1862, to Pan-American Bridge Co., New Castle, Ind.
- 120 Tons, Terre Haute, Ind., garage for Terre Haute City Lines, to Central States Bridge & Structural Co., Indianapolis.
- 110 Tons, Marshfield, Wis., bridge 526-4 beam spans to Wausau Iron Works, Wausau, Wis.

WESTERN STATES

- 3100 Tons, San Diego, Cal., Consolidated Aircraft plant additions as follows: 2200 Tons to Consolidated Steel Corp., Los

Angeles, and 900 Tons to National Steel Co., Los Angeles.

- 900 Tons, Hickam Field, T. H., warehouses, to Minneapolis-Moline Power Implement Co., Minneapolis, through Robert E. McKee, Los Angeles, contractor.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

- 7500 Tons, hangars for various naval air stations for U. S. Govt.
- 500 Tons, Dutchess County, N. Y., state bridge RC-4090.
- 115 Tons, Wallingford, Vt., state bridge 3-H.

REINFORCING STEEL

... Awards of 2380 tons; 7590 tons in new projects

ATLANTIC STATES

AWARDS

- 220 Tons, New London, Conn., sewerage disposal plant, to Concrete Steel Co., Boston.
- N. Benvenuti & Sons, New London, Conn., contractors.
- 200 Tons, Pittsburgh, Pittsburgh Coal & Coke Co. silos, to Bethlehem Steel Co., Bethlehem, Pa., through Nicholson Construction Co., contractor.

SOUTH AND CENTRAL

- 500 Tons, Terre Haute, Ind., Quaker Maid Co. plant, to Bethlehem Steel Co. Turner Construction Co., contractor.
- 300 Tons, State of Texas, county road work, to North Texas Iron & Steel Co., Fort Worth, Tex.
- 150 Tons, Fostoria, Ohio, Swift & Co. soy bean warehouse, to Calumet Steel Co., James Stewart Co., contractor.

WESTERN STATES

- 850 Tons, Wolf Creek, Okla., Fort Supply reservoir, to Sheffield Steel Corp., Kansas City, through Capitol Steel Co.
- 160 Tons, Sawyer, Wash., Yakima Project (Invitation A-33895-A), to Bethlehem Steel Co., San Francisco.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

- 1500 Tons, New Haven, Conn., housing project.
- 400 Tons, Green Haven, N. Y., four buildings for state prison; bids Dec. 21.

SOUTH AND CENTRAL

- 3000 Tons, Toledo, filtration plant, bids Dec. 6.
- 300 Tons, Cleveland, superstructure, Municipal Power Plant; bids Dec. 6.
- 200 Tons, Dresser, Ind., power plant, Public Service Co. of Indiana, Foundation Co., contractor.
- 200 Tons, Paducah, Ky., housing project.
- 175 Tons, Mt. Carmel, Ill., storm sewer; bids Nov. 27.
- 175 Tons, Evanston, Ill., Patten gymnasium, Northwestern University.
- 170 Tons, Gary, Ind., Rhodes Island Street interceptor sewer.
- 150 Tons, Cleveland, Cleveland Illuminating Co., plant.
- 150 Tons, Detroit, Parkside housing project, superstructure.
- Unstated tonnage, Springfield, Ill., state highway, letting, Dec. 5.

WESTERN STATES

- 575 Tons, Earp, Cal., Parker Dam (Invitation 44412-A); bids Dec. 4.
- 266 Tons, Leavenworth, Wash., migratory fish control (Invitation B-38064-A); bids Dec. 5.
- 118 Tons, Lincoln County, Ore., remodel bridge over Depoe Bay; bids Dec. 8.

- 115 Tons, Washington, carriage weldment assemblies for U. S. Navy.

SOUTH AND SOUTHWEST

- 2000 Tons, Gravel Switch, Ky., Kentucky dam lock gates for TVA.
- 1800 Tons, State of Oklahoma, highway bridges, bids due Dec. 12.

CENTRAL STATES

- 110 Tons, Granville, Ohio, dormitory for Denison University.

WESTERN STATES

- 450 Tons, Tillamook County, Ore., viaduct over Wilson River; bids Dec. 7.
- 265 Tons, Los Angeles, Pacific Avenue bridge over Ballona Creek; bids Dec. 6.

FABRICATED PLATES

AWARDS

- 2310 Tons, Woodside, L. I., N. Y., water pipe to Alco Products Co., Dunkirk, N. Y.
- Unstated tonnage, Cleveland, steel car ferry for Pere Marquette Railway Co., awarded to Manitowoc Shipbuilding Co., Manitowoc, Wis. (shapes also required).

- 108 Tons, Hickam Field, T. H., field company officers quarters; bids Dec. 8.
- 105 Tons, Los Angeles, Pacific Avenue bridge over Ballona Creek; bids Dec. 6.

TNEC Advisers Pleased By Reaffirmation of Steel Prices

WASHINGTON—New deal advisers on the Temporary National Economic Committee expressed themselves as highly pleased with the price announcement by Carnegie-Illinois Steel Corp., reaffirming steel prices for the first quarter.

One member of the committee told THE IRON AGE that he was particularly pleased with the announcement's reference to a "desire to cooperate in preventing inflationary tendencies" despite "rising costs and many uncertainties." The steel price announcement, he said, is "going to be helpful" in the TNEC's job of watching prices on all commodities in the months ahead—a job assigned to the committee by President Roosevelt.

The TNEC adviser expressed belief that the committee's attitude on the subject of prices probably "had something to do with the matter."

Ohio Public Utility to Spend \$2,000,000

WARREN, Ohio—A \$2,000,000 addition to the plant of the Ohio Public Service Co. here has been announced. A 50,000-hp. boiler and 35,000-kw. turbo generator with a bank of transformers for 45,000-kw. capacity will be installed. Requirements of the Copperweld Steel Co. necessitate the expansion.

... NON-FERROUS ...

... Copper and zinc listless ... Lead moderately active ... Tin quotations edge higher ... Aluminum prices reaffirmed ... Experimental smelting of tin here undertaken.

NEW YORK, Nov. 28—Non-ferrous sales here continue to drag along at levels comparable to those of the past several weeks and all prices, with the exception of tin which moved upward, remained unchanged throughout the past week. The lack of free supplies for prompt shipment kept activity in the primary copper market at a low level all week. Producers continue to quote 12.50c. per lb., Connecticut Valley, but practically it is still necessary to pay up to 13.25c. per lb. to re-

sale interests for nearby delivery. Export inquiry was light all week with prices nominally unchanged at 13.10c. to 13.15c., f.a.s. In the absence of new market developments, chief interest of the trade is centered on hearings on the proposed Chilean trade treaty. The consensus of opinion is that a reduction of the present excise tax would give greater benefits to Canada than to Chile due to the reciprocal nature of the treaty and would seriously depress the domestic copper mining industry.

Zinc

A continued dull demand, spotted occasionally by carlot buying for December and January-February delivery, characterized the spelter market in the past week. Sales of Prime Western material declined further to 2380 tons from 2940 tons in the week previous, while shipments totaled 5093 tons against 7566 in the preceding period. Undelivered contracts now stand at 61,680 tons. The sustained high volume of shipments, taken as an indication of a good rate of consumption, is giving firm support to the present, unchanged price of 6.89c. per lb., New York, for prompt Prime Western metal.

Lead

A moderate, but consistent demand for lead was experienced all the past week and most large sellers had no difficulty in disposing of their quotas. Despite closeness of the end of November, demands for spot carloads were still in evidence during the past week, but bulk of purchasing was naturally for December. Requirements of that month are estimated to be about 75 per cent covered. As yet there has been no slackening in shipments, and deferments are few and far between. Trade estimates placed November shipments at around 55,000 tons, a figure substantially below the October figure, but still in excess of production. Quotations remain firm and unaltered at 5.50c. per lb., New York.

Aluminum

Current quotations on ingot aluminum of 20c. per lb. in ton lots and 21c. per lb. in less-than-ton-lots has been reaffirmed for first quarter business by Aluminum Co. of America.

Tin

Aside from announcements by Phelps Dodge Corp. and American Metal Co. that production of refined tin on an experimental basis was being undertaken in domestic plants, there was little of interest in the market in the past week. A good demand for first quarter tin still persists, but the stalemate in the Far East makes it impossible for importers to accommodate this demand. Prices moved slightly higher during the period, but in the absence of normal trading, are still essentially nominal. The production of tin in this country, which will be undertaken primarily from Bolivian ores, has a strategic significance, but is not expected to have any market influence for some time to come. Caswell, Strauss & Co. were low on bids opened by the Treasury Department on Tuesday. The low bid, covering 250 tons of grade B tin, was 52.01c. per lb., with a discount of 1/2 per cent for cash in 10 days. Next lowest bids were 53.50c. and 54.75c.

John S. Barnes Corp., Rockford, Ill., is selling its Barnes hydraulics in the Chicago territory through Bryant Machinery & Engineering Co., Daily News Building, Chicago.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Nov. 22	Nov. 24	Nov. 25	Nov. 27	Nov. 28
Copper, Electrolytic ¹	12.50	12.50	12.50	12.50	12.50
Copper, Lake	12.50	12.50	12.50	12.50	12.50
Tin, Straits, New York	53.50	54.00	....	54.50	54.50
Zinc, East St. Louis ²	6.50	6.50	6.50	6.50	6.50
Lead, St. Louis ³	5.35	5.35	5.35	5.35	5.35

¹ Delivered Conn. Valley. Deduct 1/4c. for New York delivery. ² Add 0.39c. for New York delivery. ³ Add 0.15c. for New York delivery.

Warehouse Prices

Cents per lb., Delivered

	New York	Cleveland
Tin, Straits pig	55.50c.	Nominal
Copper, Lake	13.75c.	Nominal
Copper, electro	14.00c.	Nominal
Copper, castings	13.625c.	Nominal
*Copper sheets, hot-rolled	20.87c.	20.87c.
*Yellow brass sheets ..	19.06c.	19.06c.
*Seamless brass tubes ..	21.81c.	21.81c.
*Seamless copper tubes ..	21.37c.	21.37c.
*Yellow brass rods	15.23c.	15.23c.
Zinc slabs	7.875c.	8.125c.
Zinc sheets, No. 9 casks	12.00c.	12.10c.
Lead, American pig ...	6.50c.	6.125c.
Lead, bar	8.95c.	8.75c.
Lead, sheets, cut	8.50c.	8.50c.
Antimony, Asiatic	16.00c.	17.00c.
Alum., virgin, 99 per cent plus	21.50c.	22.50c.
Alum., No. 1 remelt, 98 to 99 per cent	19.00c.	19.50c.
Solder, 1/2 and 1/2	33.50c.	Nominal
Babbitt metal, commercial grade	Nominal	Nominal

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33%; on brass sheets and rods, 40; on brass tubes, 33%, and copper tubes, 40.

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible...	10.25c.	10.875c.
Copper, hvy. and wire...	9.25c.	9.625c.
Copper, light and bottoms	8.25c.	8.75c.
Brass, heavy	5.50c.	6.00c.
Brass, light	4.625c.	5.375c.
Hvy. machine composition	9.25c.	10.125c.
No. 1 yel. brass turnings	5.25c.	5.75c.
No. 1 red brass or comp. turnings	9.125c.	9.625c.
Lead, heavy	4.50c.	4.875c.
Cast aluminum	9.25c.	10.25c.
Sheet aluminum	15.25c.	16.25c.
Zinc	3.625c.	4.875c.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 20c.-21c. a lb.; No. 12 remelt No. 2 standard, 19c.-19.50c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICK-SILVER, \$135-\$137 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 13.75c. a lb.

IRON AND STEEL SCRAP

... No. 1 steel off \$2 at Pittsburgh ... Composite declines \$1 to \$18.58.

NOV. 28—Mill buying is at the lowest point in months and considerable weakness has developed in many markets. Based on small transactions at Pittsburgh the quoted price of No. 1 heavy melting steel is down \$2 from last week, and most other grades are off \$1. Moderate sales into consumption at Philadelphia have depressed prices there \$1 on No. 1 and cast grades. Broker transactions at Chicago have left most prices unchanged, except on a few railroad specialties. At Cleveland and Youngstown prices are off \$1 to \$2 as a result of the softness at Pittsburgh. Depressing influences have been felt also at Detroit and dealer buying prices are off 50c. there. St. Louis dealers have lowered their offers on some railroad items, as have dealers at Cincinnati. Heavy movement of scrap continues to mills on old orders and many apparently are out of the market until a clearer picture of early 1940 operations can be seen.

Even the reports of large European purchases, greatly exaggerated as they were, have failed to reverse the bearish trend of scrap prices. Meanwhile, broker buying prices for export continue to decline because of the shortage of bottoms and the amount of material on barge or on dock awaiting shipment.

Pittsburgh

Despite the maintenance of a high ingot rate in this district, the scrap market has softened considerably in the past week, the greatest weakness occurring in No. 1 steel, although other grades are also notably weaker. No. 1 heavy melting steel has been sold in this district at \$19 a ton and substantial firm offers by brokers have also been made at this level. Other points in the district, however, are able to pick up moderate amounts of No. 1 at less than \$19 a ton. On the basis of all factors involved, No. 1 steel this week is quoted at \$18.50 to \$19, down \$2 a ton from last week's average.

The following factors appear to have some bearing on the present trend in the scrap market: The approach of inventory season, heavy movement of scrap out of hiding following the high prices of a few months ago, continued lack of consumer interest, rapid and heavy movement of scrap to consumers' plants representing coverages against old orders, and the possibility that many consumers can coast along on their scrap backlogs with only moderate purchases being made until such

time as it is more definite as to the probable extent of a recession in ingot output early next year. Nonetheless, the market remains in an extremely thin condition and undoubtedly needs thorough testing before a bottom can be reached.

Chicago

The scrap market this week is rather quiet, no mill sales being reported. Brokers are able to buy heavy melting steel for \$17 and \$17.25 without much difficulty. Dealers' stocks are not large, material being shipped almost as soon as it is received.

Philadelphia

Outside of a short-lived surge of bullishness on the part of the small yard men early in the week, the recent foreign purchases have had no effect on the market here and prices continued to move downward. Difficulty in obtaining sufficient bottoms is expected to keep influence of export activities at a minimum over the near future. Moderate tonnages of No. 1 steel were sold in the past week at both \$19.50 and \$20 and No. 2 at \$18 and \$18.50, representing declines of 50c. to \$1 from previous quotations. There were also a few sales of cast grades and stove plate at prices off 50c. to \$1.

Youngstown

Quotations remain nominal but are down sympathetically because of the sharp decline at Pittsburgh. No. 1 is quoted \$18 to \$18.50. Further clarification awaits the monthly railroad lists.

Cleveland

The market remains fundamentally sound here despite absence of mill buying. No. 1 heavy melting is not overly abundant as shown by the fact some dealers are filling part of their orders out of stock. The boat movement has dwindled. Quotations are purely nominal but are down this week in sympathy with the sharp decline at Pittsburgh.

Buffalo

The market continues to mark time, no sales having been reported this week. Prices are holding at their present levels and no further signs of weakness are noted. Mills are consuming scrap at a high rate.

St. Louis

The scrap market is quiet. It is expected there will be no important buying by mills until after the turn of the year. The recently placed British contracts will draw a considerable portion of the tonnage through Southwestern ports and will tap sources of supply of the St. Louis market. There have been declines in offerings for railroad specialties in the past week. Railroad lists: Pennsylvania, 24,000 tons;

Chicago, Milwaukee, St. Paul & Pacific, 2200 tons; and B. & O., 7800 tons.

Cincinnati

Trading is limited to odd lots among dealers for application on continuing contracts or for material that can be bought at a price. Mills generally are reluctant to take any more material than they need, since inventory periods are just around the corner. Currently, prices are unchanged except for a few adjustments in items which appear to be a trifle softer than a week ago.

New York

Information from reliable sources indicates that the recent new British purchases amounted to about 250,000 tons on top of 150,000 tons of undelivered scrap on old order and not the 750,000 tons so widely reported. Additional tonnages have yet to be closed, however, with brokers who have not yet participated. The price is based on THE IRON AGE composite of No. 1 heavy melting steel. Meanwhile, there has been no change in the vessel shortage and the downward trend in dealer buying prices continues, resulting in a much lower spread in buying prices, although the low end of the range is unchanged. Last week there was wide divergence in broker offers. No. 1 steel on cars for domestic delivery is also weaker, as is heavy breakable cast.

Boston

The scrap market slipped rather sharply the past week, prices for most materials being down 50c. to \$1 a ton. Lower prices have not stimulated business as yet. Domestic consumers are talking still lower prices, an indication that through scrap they expect to cut operating costs and hold current finished product prices through the first quarter. Exporters still take a "don't care if we don't buy" attitude. At present no boats are loading at Providence, Boston or Portland.

Toronto

Iron and steel scrap is appearing on the local market in good volume, with dealers reporting no change in prices for the week, although current quotations are firm. Railroad offerings have been appearing and these have been quickly absorbed by dealers acting as brokers for the mills. Cast scrap is appearing in sufficient volume to take care of demands. Steel mills are taking all the scrap offered by dealers but have not raised bid prices and contracts are for short terms only.

Detroit

Cessation of buying of scrap by the principal consumer in this area a week ago has added further depressing effects to prices, particularly on heavy melting steel, hydraulic bundles and low phos. plate. There has been very little activity in the market because most short orders have been covered, with some exceptions. Yards have been cleaned out and at the same time there has been a reduction in scrap consumption because of Chrysler inactivity and slower operations in some parts plants. Otherwise, production of scrap is at the highest point in recent weeks.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$18.50 to \$19.00
Railroad heavy melting	20.50 to 21.00
No. 2 heavy melting	17.00 to 17.50
Scrap rails	21.50 to 22.00
Rails 3 ft. and under	22.50 to 23.00
Comp. sheet steel	18.50 to 19.00
Hand bundled sheets	17.50 to 18.00
Heavy steel axle turn.	16.50 to 17.00
Machine shop turnings	13.00 to 13.50
Short shov. turnings	14.50 to 15.00
Mixed bor. & turn.	12.00 to 12.50
Cast iron borings	12.00 to 12.50
Cast iron carwheels	19.50 to 20.00
Heavy breakable cast.	16.00 to 16.50
No. 1 cupola cast	19.50 to 20.00
RR. knuckles & coup.	25.00 to 25.50
Rail coil springs	25.00 to 25.50
Rail leaf springs	25.00 to 25.50
Roll steel wheels	25.00 to 25.50
Low phos. billet crops	25.50 to 26.00
Low phos. punchings	23.50 to 24.00
Low phos. heavy plate	24.00 to 24.50
Railroad malleable	21.50 to 22.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$19.50 to \$20.00
No. 2 hvy. mltng. steel.	18.00 to 18.50
Hydraulic bund., new.	20.50 to 21.00
Hydraulic bund., old.	17.00 to 17.50
Steel rails for rolling	23.00 to 23.50
Cast iron carwheels	21.00 to 21.50
Hvy. breakable cast.	19.00 to 19.50
No. 1 cast	21.00 to 21.50
Stove plate (steel wks)	16.50
Railroad malleable	22.00
Machine shop turn.	13.50 to 14.00
No. 1 blast furnace	12.50
Cast borings	13.50 to 14.00
Heavy axle turnings	16.00 to 16.50
No. 1 low phos. hvy.	25.50 to 26.00
Couplers & knuckles	26.00
Roll steel wheels	26.00
Steel axles	24.50 to 25.00
Shafting	24.50 to 25.00
Spec. iron & steel pipe	17.00 to 17.50
No. 1 forge fire	16.50 to 17.00
Cast borings (chem.)	14.00 to 14.50

CHICAGO

Delivered to Chicago district consumers:

Per Gross Ton	
Hvy. mltng. steel	\$17.00 to \$17.50
Auto. hvy. mltng. steel alloy free	16.00 to 16.50
No. 2 auto steel	13.00 to 13.50
Shoveling steel	17.00 to 17.50
Factory bundles	16.50 to 17.00
Dealers' bundles	15.00 to 15.50
No. 1 busheling	16.00 to 16.50
No. 2 busheling, old	7.00 to 7.50
Roll steel wheels	20.00 to 20.50
Railroad tires, cut	20.25 to 20.75
Railroad leaf springs	19.50 to 20.00
Steel coup. & knuckles	19.50 to 20.00
Axle turnings	16.00 to 16.50
Coil springs	20.50 to 21.00
Axle turn. (elec.)	18.00 to 18.50
Low phos. punchings	21.00 to 21.50
Low phos. plates 12 in. and under	20.50 to 21.00
Cast iron borings	9.50 to 10.00
Short shov. turn.	11.00 to 11.50
Machine shop turn.	9.50 to 10.00
Rerolling rails	20.00 to 20.50
Steel rails under 3 ft.	20.00 to 20.50
Steel rails under 2 ft.	20.50 to 21.00
Angle bars, steel	19.00 to 19.50
Cast iron carwheels	16.25 to 16.75
Railroad malleable	19.50 to 20.00
Agric. malleable	15.50 to 16.00

Per Net Ton

Iron car axles	22.75 to 23.25
Steel car axles	21.00 to 21.50
Locomotive tires	16.00 to 16.50
Pipes and flues	12.50 to 13.00
No. 1 machinery cast.	14.75 to 15.25
Clean auto. cast	15.00 to 15.50
No. 1 railroad cast.	14.25 to 14.75
No. 1 agric. cast.	12.50 to 13.00
Stove plate	11.00 to 11.50
Grate bars	11.00 to 11.50
Brake shoes	12.50 to 13.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$18.50 to \$19.00
No. 2 hvy. mltng. steel.	17.50 to 18.00
Low phos. plate	23.50 to 24.00
No. 1 busheling	17.75 to 18.25
Hydraulic bundles	18.00 to 18.50
Machine shop turn	12.50 to 13.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$18.00 to \$18.50
No. 2 hvy. mltng. steel.	17.00 to 17.50
Comp. sheet steel	17.75 to 18.25
Light bund. stampings	15.50 to 16.00
Drop forge flashings	17.00 to 17.50
Machine shop turn	12.00 to 12.50
Short shov. turn	12.75 to 13.25
No. 1 busheling	17.25 to 17.75
Steel axle turnings	17.00 to 17.50
Low phos. billet and bloom crops	26.00 to 26.50
Cast iron borings	12.50 to 13.00
Mixed bor. & turn.	12.50 to 13.00
No. 2 busheling	12.50 to 13.00
No. 1 cupola cast	20.00 to 20.50
Railroad grate bars	14.50 to 15.00
Stove plate	14.50 to 15.00
Rails under 3 ft.	25.00 to 25.50
Rails for rolling	22.75 to 23.25
Railroad malleable	24.00 to 24.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$19.50 to \$20.00
No. 2 hvy. mltng. steel.	17.50 to 18.00
Scrap rails	20.00 to 20.50
New hvy. b'ndled sheets	17.50 to 18.00
Old hydraul. bundles	16.50 to 17.00
Drop forge flashings	17.50 to 18.00
No. 1 bushelings	17.50 to 18.00
Machine shop turn	11.00 to 11.50
Shov. turnings	13.50 to 14.00
Mixed bor. & turn.	11.50 to 12.00
Cast iron borings	11.50 to 12.00
Knuckles & couplers	23.00 to 24.00
Coil & leaf springs	23.00 to 24.00
Roll steel wheels	23.00 to 24.00
No. 1 machinery cast.	19.00 to 19.50
No. 1 cupola cast	18.00 to 18.50
Stove plate	15.50 to 16.00
Steel rails under 3 ft.	22.50 to 23.00
Cast iron carwheels	19.50 to 20.00
Railroad malleable	20.50 to 21.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting	\$17.50 to \$18.00
No. 1 hvy. melting	16.00 to 16.50
No. 2 hvy. melting	15.00 to 15.50
No. 1 locomotive tires	18.00 to 18.50
Misc. stand. sec. rails	17.00 to 17.50
Railroad springs	20.00 to 20.50
Bundled sheets	12.00 to 12.50
No. 1 busheling	14.00 to 14.50
Cast bor. & turn.	7.00 to 7.50
Machine shop turn	8.00 to 8.50
Heavy turnings	12.50 to 13.00
Rails for rolling	20.00 to 20.50
Steel car axles	21.50 to 22.00
No. 1 RR. wrought	12.50 to 13.00
No. 2 RR. wrought	16.00 to 16.50
Steel rails under 3 ft.	21.00 to 21.50
Steel angle bars	19.00 to 19.50
Cast iron carwheels	19.00 to 19.50
No. 1 machinery cast.	18.50 to 19.00
Railroad malleable	18.00 to 18.50
No. 1 railroad cast.	16.00 to 16.50
Stove plate	11.50 to 12.00
Grate bars	10.50 to 11.00
Brake shoes	12.50 to 13.00

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel.	\$15.00 to \$15.50
No. 2 hvy. mltng. steel.	13.00 to 13.50
Scrap rails for mltng.	19.00 to 19.50
Loose sheet clippings	10.50 to 11.00
Hydraul. b'ndled sheets	14.50 to 15.00
Cast iron borings	5.50 to 6.00
Machine shop turn	6.50 to 7.00
No. 1 busheling	11.50 to 12.00
No. 2 busheling	4.50 to 5.00
Rails for rolling	20.50 to 21.00
No. 1 locomotive tires	16.50 to 17.00
Short rails	22.00 to 22.50
Cast iron carwheels	17.00 to 17.50
No. 1 machinery cast.	18.50 to 19.00
No. 1 railroad cast.	16.50 to 17.00
Burnt cast	9.50 to 10.00
Stove plate	9.50 to 10.00
Agric. malleable	14.75 to 15.25
Railroad malleable	17.75 to 18.25
Mixed hvy. cast	15.75 to 16.25

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel	\$17.00
Scrap steel rails	19.00
Short shov. turnings	9.00
Stove plate	\$10.50 to 11.00
Steel axles	21.00
Iron axles	21.00
No. 1 RR. wrought	15.00
Rails for rolling	21.00 to 22.00
No. 1 cast	17.00
Tramcar wheels	17.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. industrial steel	\$15.00 to \$15.50
No. 2 hvy. mltng. steel	14.50 to 15.00
Borings and turnings	8.50 to 9.00
Long turnings	7.50 to 8.00
Short shov. turnings	10.00 to 10.50
No. 1 machinery cast	15.00 to 15.50
Automotive cast	16.50 to 17.00
Hvy. breakable cast	12.00 to 12.50
Stove plate	10.50 to 11.00
Hydraul. comp. sheets	16.25 to 16.75
New factory bushel	14.00 to 14.50
Sheet clippings	11.25 to 12.25
Flashings	13.75 to 14.25
Low phos. plate scrap	15.50 to 16.00

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel	\$15.75 to \$16.25
No. 2 hvy. mltng. steel	13.50 to 14.00
Hvy. breakable cast	15.00
No. 1 machinery cast	16.50 to 17.00
No. 2 cast	15.00 to 15.50
Stove plate	13.00 to 13.50
Steel car axles	19.00 to 20.00
Shafting	19.00 to 20.00
No. 1 RR. wrought	14.00 to 15.00
No. 1 wrought long	12.50 to 13.00
Spec. iron & steel pipe	13.50 to 14.00
Rails for rolling	19.00 to 20.00
Clean steel turnings	9.00 to 9.50
Cast borings	8.00 to 9.00
No. 1 blast furnace	8.00 to 9.00
Cast borings (chem.)	Nominal
Unprepared yard scrap	9.50 to 10.90
Light iron	5.00 to 5.50

Per gross ton, delivered local foundries:

No. 1 machin. cast.	\$20.00 to \$22.00
No. 2 cast	18.50 to 19.00

* \$1.50 less for truck loads.

BOSTON

Dealers' buying prices per gross ton:

Breakable cast	\$13.50 to \$13.65
Machine shop turn	8.00
Mixed bor. & turn.	6.00 to 6.25
Bun. skeleton long	11.50 to 11.75
Shafting	18.50 to 18.65
Stove plate	11.00
Cast bor. chemical	9.50 to 10.00

Per gross ton, delivered consumers' yards:

Textile cast	\$17.00 to \$18.00
No. 1 machine cast	17.00 to 18.00

Per gross ton delivered dealers' yards:

No. 1 hvy. mltng. steel	\$15.00
No. 2 steel	14.00

PACIFIC COAST

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel	\$16.00 to \$17.50
No. 2 hvy. mltng. steel	15.00 to 16.50

CANADA

Dealers' buying prices at these yards, per gross ton:

Toronto Montreal	
No. 1 hvy. mltng. steel	\$11.25 \$10.75
No. 2 hvy. mltng. steel	10.00 9.50
Mixed dealers steel	9.25 8.75
Drop forge flashings	10.25 9.75
New loose clippings	7.00 6.00
Busheling	5.50 5.00
Scrap pipe	8.00 7.50
Steel turnings	6.25 5.50
Cast borings	5.75 5.00
Machinery cast	18.00 17.50
Dealers cast	17.00 16.50
Stove plate	12.00 11.50

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges	
No. 1 hvy. mltng. steel	\$15.50 to \$16.00
No. 2 hvy. mltng. steel	14.00 to 14.50
No. 2 cast	14.50 to 15.00
Stove plate	13.00 to 13.50
Boston on cars at Army Base or Mystic Wharf	
No. 1 hvy. mltng. steel	\$17.00
No. 2 hvy. mltng. steel	16.00
Rails (scrap)	17.00
Stove plate	\$12.00 to \$12.50
Philadelphia, delivered alongside boats, Port Richmond	
No. 1 hvy. mltng. steel	\$19.25 to \$19.50
No. 2 hvy. mltng. steel	18.00 to 18.25

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

Steel prices on these pages are base prices only and f.o.b. mill unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases the amount of freight which must be absorbed in order to meet competition

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are \$2 higher. F.o.b. Duluth, billets only, \$2 higher.

Per Gross Ton
Rerolling\$34.90
Forging quality 40.90

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton
Open hearth or bessemer\$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.
Grooved, universal and sheared1.90c.

Wire Rods

(No. 5 to 9/32 in.)

Per Gross Ton
Pittsburgh, Chicago or Cleveland\$43.00
Worcester, Mass. 45.00
Birmingham 43.00
San Francisco 52.00
Rods over 9/32 in. or 47/64 in., inclusive, \$5 a ton over base.

SOFT STEEL BARS

Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Buffalo and Birmingham 2.15c.
Detroit, delivered 2.25c.
Duluth 2.25c.
Philadelphia, delivered 2.47c.
New York 2.49c.
On cars dock Gulf ports 2.50c.
On cars dock Pacific ports 2.75c.

RAIL STEEL BARS

(For merchant trade)

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham 2.15c.
On cars dock Tex. Gulf ports... 2.50c.
On cars dock Pacific ports 2.75c.

BILLET STEEL REINFORCING BARS

(Straight lengths as quoted by distributors)

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Cleveland, Youngstown or Sparrows Pt. 2.15c.
Detroit, delivered 2.25c.
On cars dock Tex. Gulf ports... 2.50c.
On cars dock Pacific ports 2.50c.

RAIL STEEL REINFORCING BARS

(Straight lengths as quoted by distributors)

Pittsburgh, Chicago, Gary, Buffalo, Cleveland, Youngstown or Birmingham 2.15c.
Detroit, delivered 2.25c.
On cars dock Tex. Gulf ports... 2.50c.
On cars dock Pacific ports 2.50c.

IRON BARS

Chicago and Terre Haute 2.15c.
Pittsburgh (refined) 3.60c.

COLD FINISHED BARS AND SHAFTING*

Pittsburgh, Buffalo, Cleveland, Chicago, and Gary 2.65c.
Detroit 2.70c.

* In quantities of 20,000 to 39,999 lb.

PLATES

Base per Lb.
Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont, Del. 2.10c. to 2.35c.

Philadelphia, del'd 2.15c. to 2.40c.
New York, del'd 2.29c. to 2.54c.
On cars dock Gulf ports 2.45c.
On cars dock Pacific ports 2.60c.
Wrought iron plates, P'tg. 3.80c.

FLOOR PLATES

Pittsburgh or Chicago 3.35c.
New York, del'd 3.71c.
On cars dock Gulf ports 3.70c.
On cars dock Pacific ports 3.95c.

STRUCTURAL SHAPES

Base per Lb.
Pittsburgh, Chicago, Gary, Buffalo, Bethlehem or Birmingham 2.10c.
Philadelphia, del'd 2.215c.
New York, del'd 2.27c.
On cars dock Gulf ports 2.45c.
On cars dock Pacific ports 2.70c.

STEEL SHEET PILING

Base per Lb.
Pittsburgh, Chicago or Buffalo 2.40c.
On cars dock Gulf ports 2.85c.
On cars dock Pacific ports 2.90c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton\$40.00
Angle bars, per 100 lb. 2.70

F.o.b. Basing Points

Light rails (from billets) per gross ton\$40.00
Light rails (from rail steel) per gross ton 39.00

Base per Lb.
Cut spikes 3.00c.
Screw spikes 4.55c.
Tie plates, steel 2.15c.
Tie plates, Pacific Coast ports. 2.25c.
Track bolts, to steam railroads 4.15c.
Track bolts to jobbers, all sizes (per 100 counts) 65-5

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa.; Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS

Hot Rolled

Base per Lb.
Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown or Chicago 2.10c.
Detroit, delivered 2.20c.
Philadelphia, delivered 2.27c.
Granite City 2.20c.
On cars dock Pacific ports 2.60c.
Wrought iron, Pittsburgh 4.10c.

Cold Rolled*

Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown or Chicago 3.05c.
Detroit, delivered 3.15c.
Granite City 3.15c.
Philadelphia, delivered 3.37c.
On cars dock Pacific ports 3.65c.

* Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base.
From May 10 up to and including May 15, reductions from the base price of hot and cold rolled sheets running from \$4 to \$8 a ton were prevalent. Concessions withdrawn on May 15.
Subsequent to May 15, many orders originally placed at \$4 to \$6 below the base price were adjusted to the full \$8 concession.

Galvanized Sheets, 24 Gage

Pittsburgh, Chicago, Gary, Sparrows Point, Buffalo, Middletown, Youngstown or Birmingham 3.50c.
Philadelphia, del'd 3.67c.
Granite City 3.60c.
On cars dock Pacific ports 4.00c.
Wrought iron, Pittsburgh 6.10c.

Electrical Sheets (F.o.b. Pittsburgh)

Base per Lb.
Field grade 3.20c.
Armature 3.55c.

Electrical 4.05c.
Motor 4.95c.
Dynamo 5.65c.
Transformer 72 6.15c.
Transformer 65 7.15c.
Transformer 58 7.65c.
Transformer 52 8.45c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extra plus 25c per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

Long Ternes

No. 24 unassorted 8-lb. coating f.o.b. Pittsburgh or Gary 3.80c.
F.o.b. cars dock Pacific ports. 4.50c.

Vitreous Enameling Stock, 20 Gage*
Pittsburgh, Chicago, Gary, Youngstown, Middletown or Cleveland 3.35c.
Detroit, del'd 3.45c.
Granite City 3.45c.
On cars dock Pacific ports 3.95c.

TIN MILL PRODUCTS

*Tin Plate

Per Base Box
Standard cokes, Pittsburgh, Chicago and Gary\$5.00
Standard cokes, Granite City... 5.10

* Prices effective Nov. 10 on shipments through first quarter of 1939.

Special Coated Manufacturing Ternes

Per Base Box
Granite City\$4.40
Pittsburgh or Gary 4.30

Roofing Terne Plate

(F.o.b. Pittsburgh per Package, 112 sheets)
20x14 in. 20x28 in.
8-lb. coating I.C. \$6.00 \$12.00
15-lb. coating I.C. 7.00 14.00
20-lb. coating I.C. 7.50 15.00
25-lb. coating I.C. 8.00 16.00
30-lb. coating I.C. 8.63 17.25
40-lb. coating I.C. 9.75 19.50

Black Plate, 29 gage and lighter
Pittsburgh, Chicago and Gary 3.05c.
Granite City 3.15c.
On cars dock Pacific ports, boxed 4.00c.

HOT ROLLED STRIP

(Widths up to 12 in.)

Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown or Birmingham 2.10c.
Detroit, delivered 2.20c.
On cars dock Pacific ports 2.70c.

Cooperage Stock

Pittsburgh & Chicago 2.10c.
From May 10 up to and including May 15, reductions in the base price of hot rolled strip running from \$4 to \$8 a ton were prevalent. Concessions withdrawn on May 15.
Subsequent to May 15, many orders originally placed at \$4 to \$6 below the base price were adjusted to the full \$8 concession.

COLD ROLLED STRIP*

Base per Lb.
Pittsburgh, Youngstown or Cleveland 2.80c.
Chicago 2.90c.
Detroit, delivered 2.90c.
Worcester 3.00c.

* Carbon 0.25 and less.

Commodity Cold Rolled Strip

Pittsburgh, Youngstown, or Cleveland 2.95c.
Detroit, delivered 3.05c.
Worcester 3.35c.

From May 10 up to and including May 15, reductions from the base price of cold rolled strip amounting to \$4 a ton were prevalent. Concessions withdrawn on May 15.

COLD ROLLED SPRING STEEL

Pittsburgh and Cleveland Worcester
Carbon 0.26-0.50% 2.80c. 3.00c.
Carbon 0.51-0.75 4.30c. 4.50c.
Carbon 0.76-1.00 6.15c. 6.35c.
Carbon 1.01-1.25 8.35c. 8.55c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh, Chicago, Cleveland and Birmingham)

To Manufacturing Trade

	Per Lb.
Bright wire	2.60c.
Galvanized wire, base	2.65c.*
Spring wire	3.20c.

* On galvanizing wire to manufacturing trade, size and galvanizing extras are charged, the price Nos. 6 to 9 gage, inclusive, thus being 3.15c.

To the Trade

	Base per Keg
Standard wire nails	\$2.55
Coated nails	2.55
Cut nails, carloads	3.70

	Base per 100 Lb.
Annealed fence wire	\$2.90
Galvanized fence wire	3.30
Twisted barbed wire	3.40
Woven wire fence, No. 11 and heavier, base col.	70
Woven wire fence, lighter than No. 11, base col.	67
Single loop bale ties, base col.	56
Stand. 2 pt., 12.5 gage barbed cattle wire, per 80 rod spool.	\$2.70
Stand. 2 pt., 12.5 gage barbed hog wire, per 80 rod spool.	\$2.88

Note: Birmingham base same on above items, except spring wire.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld		Wrought Iron	
In.	Black Galv.	In.	Black Galv.
1/4	56	1/4	36
1/2	59	1/2	43 1/2
3/4	63 1/2	3/4	54
1	66 1/2	1	60 1/2
1 1/4	68 1/2	1 1/4	60 1/2
2	61	2	52 1/2
2 1/2	64	2 1/2	55 1/2
3	66	3	57 1/2
3 1/2	68	3 1/2	59
4	70	4	61
4 1/2	72	4 1/2	63
5	74	5	65
5 1/2	76	5 1/2	67
6	78	6	69
6 1/2	80	6 1/2	71
7	82	7	73
7 1/2	84	7 1/2	75
8	86	8	77
8 1/2	88	8 1/2	79
9	90	9	81
9 1/2	92	9 1/2	83
10	94	10	85
10 1/2	96	10 1/2	87
11	98	11	89
11 1/2	100	11 1/2	91
12	102	12	93
12 1/2	104	12 1/2	95
13	106	13	97
13 1/2	108	13 1/2	99
14	110	14	101
14 1/2	112	14 1/2	103
15	114	15	105
15 1/2	116	15 1/2	107
16	118	16	109
16 1/2	120	16 1/2	111
17	122	17	113
17 1/2	124	17 1/2	115
18	126	18	117
18 1/2	128	18 1/2	119
19	130	19	121
19 1/2	132	19 1/2	123
20	134	20	125
20 1/2	136	20 1/2	127
21	138	21	129
21 1/2	140	21 1/2	131
22	142	22	133
22 1/2	144	22 1/2	135
23	146	23	137
23 1/2	148	23 1/2	139
24	150	24	141
24 1/2	152	24 1/2	143
25	154	25	145
25 1/2	156	25 1/2	147
26	158	26	149
26 1/2	160	26 1/2	151
27	162	27	153
27 1/2	164	27 1/2	155
28	166	28	157
28 1/2	168	28 1/2	159
29	170	29	161
29 1/2	172	29 1/2	163
30	174	30	165
30 1/2	176	30 1/2	167
31	178	31	169
31 1/2	180	31 1/2	171
32	182	32	173
32 1/2	184	32 1/2	175
33	186	33	177
33 1/2	188	33 1/2	179
34	190	34	181
34 1/2	192	34 1/2	183
35	194	35	185
35 1/2	196	35 1/2	187
36	198	36	189
36 1/2	200	36 1/2	191
37	202	37	193
37 1/2	204	37 1/2	195
38	206	38	197
38 1/2	208	38 1/2	199
39	210	39	201
39 1/2	212	39 1/2	203
40	214	40	205
40 1/2	216	40 1/2	207
41	218	41	209
41 1/2	220	41 1/2	211
42	222	42	213
42 1/2	224	42 1/2	215
43	226	43	217
43 1/2	228	43 1/2	219
44	230	44	221
44 1/2	232	44 1/2	223
45	234	45	225
45 1/2	236	45 1/2	227
46	238	46	229
46 1/2	240	46 1/2	231
47	242	47	233
47 1/2	244	47 1/2	235
48	246	48	237
48 1/2	248	48 1/2	239
49	250	49	241
49 1/2	252	49 1/2	243
50	254	50	245
50 1/2	256	50 1/2	247
51	258	51	249
51 1/2	260	51 1/2	251
52	262	52	253
52 1/2	264	52 1/2	255
53	266	53	257
53 1/2	268	53 1/2	259
54	270	54	261
54 1/2	272	54 1/2	263
55	274	55	265
55 1/2	276	55 1/2	267
56	278	56	269
56 1/2	280	56 1/2	271
57	282	57	273
57 1/2	284	57 1/2	275
58	286	58	277
58 1/2	288	58 1/2	279
59	290	59	281
59 1/2	292	59 1/2	283
60	294	60	285
60 1/2	296	60 1/2	287
61	298	61	289
61 1/2	300	61 1/2	291
62	302	62	293
62 1/2	304	62 1/2	295
63	306	63	297
63 1/2	308	63 1/2	299
64	310	64	301
64 1/2	312	64 1/2	303
65	314	65	305
65 1/2	316	65 1/2	307
66	318	66	309
66 1/2	320	66 1/2	311
67	322	67	313
67 1/2	324	67 1/2	315
68	326	68	317
68 1/2	328	68 1/2	319
69	330	69	321
69 1/2	332	69 1/2	323
70	334	70	325
70 1/2	336	70 1/2	327
71	338	71	329
71 1/2	340	71 1/2	331
72	342	72	333
72 1/2	344	72 1/2	335
73	346	73	337
73 1/2	348	73 1/2	339
74	350	74	341
74 1/2	352	74 1/2	343
75	354	75	345
75 1/2	356	75 1/2	347
76	358	76	349
76 1/2	360	76 1/2	351
77	362	77	353
77 1/2	364	77 1/2	355
78	366	78	357
78 1/2	368	78 1/2	359
79	370	79	361
79 1/2	372	79 1/2	363
80	374	80	365
80 1/2	376	80 1/2	367
81	378	81	369
81 1/2	380	81 1/2	371
82	382	82	373
82 1/2	384	82 1/2	375
83	386	83	377
83 1/2	388	83 1/2	379
84	390	84	381
84 1/2	392	84 1/2	383
85	394	85	385
85 1/2	396	85 1/2	387
86	398	86	389
86 1/2	400	86 1/2	391
87	402	87	393
87 1/2	404	87 1/2	395
88	406	88	397
88 1/2	408	88 1/2	399
89	410	89	401
89 1/2	412	89 1/2	403
90	414	90	405
90 1/2	416	90 1/2	407
91	418	91	409
91 1/2	420	91 1/2	411
92	422	92	413
92 1/2	424	92 1/2	415
93	426	93	417
93 1/2	428	93 1/2	419
94	430	94	421
94 1/2	432	94 1/2	423
95	434	95	425
95 1/2	436	95 1/2	427
96	438	96	429
96 1/2	440	96 1/2	431
97	442	97	433
97 1/2	444	97 1/2	435
98	446	98	437
98 1/2	448	98 1/2	439
99	450	99	441
99 1/2	452	99 1/2	443
100	454	100	445
100 1/2	456	100 1/2	447
101	458	101	449
101 1/2	460	101 1/2	451
102	462	102	453
102 1/2	464	102 1/2	455
103	466	103	457
103 1/2	468	103 1/2	459
104	470	104	461
104 1/2	472	104 1/2	463
105	474	105	465
105 1/2	476	105 1/2	467
106	478	106	469
106 1/2	480	106 1/2	471
107	482	107	473
107 1/2	484	107 1/2	475
108	486	108	477
108 1/2	488	108 1/2	479
109	490	109	481
109 1/2	492	109 1/2	483
110	494	110	485
110 1/2	496	110 1/2	487
111	498	111	489
111 1/2	500	111 1/2	491
112	502	112	493
112 1/2	504	112 1/2	495
113	506	113	497
113 1/2	508	113 1/2	499
114	510	114	501
114 1/2	512	114 1/2	503
115	514	115	505
115 1/2	516	115 1/2	507
116	518	116	509
116 1/2	520	116 1/2	511
117	522	117	513
117 1/2	524	117 1/2	515
118	526	118	517
118 1/2	528	118 1/2	519
119	530	119	521
119 1/2	532	119 1/2	523
120	534	120	525
120 1/2	536	120 1/2	527
121	538	121	529
121 1/2	540	121 1/2	531
122	542	122	533
122 1/2	544	122 1/2	535
123	546	123	537
123 1/2	548	123 1/2	539
124	550	124	541
124 1/2	552	124 1/2	543
125	554	125	545
125 1/2	556	125 1/2	547
126	558	126	549
126 1/2	560	126 1/2	551
127	562	127	553
127 1/2	564	127 1/2	555
128	566	128	557
128 1/2	568	128 1/2	559
129	570	129	561
129 1/2	572	129 1/2	563
130	574	130	565
130 1/2	576	130 1/2	567
131	578	131	569
131 1/2	580	131 1/2	571
132	582	132	573
132 1/2	584	132 1/2	575
133	586	133	577
133 1/2	588	133 1/2	579
134	590	134	581
134 1/2	592	134 1/2	583
135	594	135	585
135 1/2	596	135 1/2	587
136	598	136	589
136 1/2	600	136 1/2	591
137	602	137	593
137 1/2	604	137 1/2	595
138	606	138	597
138 1/2	608		

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	\$24.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	24.00
Delivered Brooklyn	26.50
Delivered Newark or Jersey City	25.53
Delivered Philadelphia	24.84
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown.	23.00
F.o.b. Buffalo	23.00
F.o.b. Detroit	23.00
Southern, delivered Cincinnati.	23.06
Northern, delivered, Cincinnati.	23.44
F.o.b. Duluth	23.50
F.o.b. Provo, Utah	21.00
Delivered, San Francisco, Los Angeles or Seattle	26.50
F.o.b. Birmingham*	19.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 0.70 per cent and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same, except at Birmingham and Provo, which are not malleable iron basing points.

Basic

F.o.b. Everett, Mass.	\$23.50
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	23.50
F.o.b. Buffalo	22.00
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown.	22.50
Delivered Philadelphia	24.34
Delivered Canton, Ohio	23.89
Delivered Mansfield, Ohio	24.44
F.o.b. Birmingham	18.00

Bessemer

F.o.b. Buffalo	\$24.00*
F.o.b. Everett, Mass.	25.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	25.00
Delivered Newark or Jersey City	26.53
Erie, Pa., and Duluth	24.00
F.o.b. Neville Island, Toledo, Chicago and Youngstown.	23.50
F.o.b. Birmingham	24.00
Delivered Cincinnati	24.11
Delivered Canton, Ohio	24.89
Delivered Mansfield, Ohio	25.44

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Buffalo.	\$28.50
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Gray Forge

Valley or Pittsburgh furnace.	\$22.50
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Charcoal

Lake Superior furnace	\$27.00
Delivered Chicago	30.34

Canadian Pig Iron

Per Gross Ton

Montreal

Foundry iron	\$27.50 base
Malleable	28.00 base
Basic	27.50 base

Toronto

Foundry iron	\$25.50 base
Malleable	26.00 base
Basic	25.50 base

On all grades 2.25 per cent silicon and under to base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.	
Domestic, 80% (carload)	\$100.00

Spiegeleisen

Per Gross Ton Furnace	
Domestic, 19 to 21%	\$32.00
Domestic, 26 to 28%	39.50

Electric Ferrosilicon

Per Gross Ton Delivered; Lump Size	
50% (carload lots, bulk)	\$69.50*
50% (ton lots in 50 gal. bbl.) ..	80.50*
75% (carload lots, bulk)	126.00*
75% (ton lots in 50 gal. bbl.) ..	139.00*

Bessemer Ferrosilicon

F.o.b. Furnace, Jackson, Ohio	
Per Gross Ton	
10.00 to 10.50%	\$32.50
For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.	
For each unit of manganese over 2%, \$1 per ton additional.	
Base prices at Buffalo are \$1.25 a ton higher than at Jackson.	

Silvery Iron

Per Gross Ton	
F.o.b. Jackson, Ohio, 5.00 to 5.50%	\$26.50
For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.	
The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed.	
Base prices at Buffalo are \$1.25 a ton higher than at Jackson.	
Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.	

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots, Lump Size, on Contract	
4 to 6% carbon	10.50c.*
2% carbon	16.50c.*
1% carbon	17.50c.*
0.10% carbon	19.50c.*
0.06% carbon	20.00c.*

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract	
8% carbon	\$38.00
2.50% carbon	103.00
2% carbon	108.00
1% carbon	118.00

Other Ferroalloys

Ferrotungsten, per lb. contained W del. carloads.	\$2.00
Ferrotungsten, 100 lbs. and less	2.25
Ferrovandium, contract, per lb. contained V., delivered	\$2.70 to \$2.90†
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., ton lots	\$2.25†
Ferrocobalt, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	\$142.50
Ferrocobalt, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	\$157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton	\$58.50
Ferrophosphorus, electrolytic 23-26% in car lots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, \$3 unitage, freight equalized with Nashville	\$75.00
Ferromolybdenum, per lb. Mo. f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo. f.o.b. furnace	80c.
Molybdenum oxide briquettes 48-52% Mo; per lb. contained Mo. f.o.b. Langeloth, Pa.	80c.

* Spot prices are \$5 per ton higher.
† Spot prices are 10c. per lb. of contained element higher.

*ORES

Lake Superior Ores Delivered Lower Lake Ports

Per Gross Ton	
Old range, Bessemer, 51.50%	\$5.25
Old range, non-Bessemer, 51.50% ..	5.10
Messabi, Bessemer, 51.50%	5.10
Messabi, non-Bessemer, 51.50% ..	4.95
High phosphorus, 51.50%	4.85

Foreign Ores*

C.I.F. Philadelphia or Baltimore	
Per Unit	
Iron, low phos., copper free, 55 to 58% dry, Algeria	12c.
Iron, low phos., Swedish, average, 68% iron	12c.
Iron, basic or foundry, Swedish, aver. 65% iron	11c.
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	44c.
Man., African, Indian, 44-48%	43c.
Man., African, Indian, 49-51%	45c.
Man., Brazilian, 46 to 48%	40c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered.	\$23.00 to \$24.00
Tungsten, domestic, scheelite delivered	25.00
Chrome or (lump) c.i.f. Atlantic Seaboard, per gross ton: South African (low grade)	\$17.00
Rhodesian, 45%	21.00
Rhodesian, 48%	25.00
Turkish, 48-49%	26.00
Turkish, 45-46%	23.00
Turkish, 40-41%	18.50
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton: 50%	\$26.00
48-49%	25.00

* All foreign ore prices are nominal

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	\$22.00
Domestic, f.o.b. Ohio River landing barges	\$22.00
No. 2 lump, 85-5, f.o.b. Kentucky and Ill. mines.	\$20.00 to 22.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	\$22.50 to \$23.50
Domestic No. 1 ground bulk, 96 to 98% calcium fluoride, not over 2% silicon, f.o.b. Illinois and Kentucky mines	\$31.60

FUEL OIL

Per Gal.

No. 2, f.o.b. Bayonne, N. J.	4.375c.
No. 6, f.o.b. Bayonne, N. J.	2.74c.
No. 5 Bur. Stds., del'd Chicago ..	3.25c.
No. 6 Bur. Stds., del'd Chicago ..	2.75c.
No. 3 distillate, del'd Cleve'd.	5.375c.
No. 4 industrial, del'd Cleve'd.	5.125c.
No. 5 industrial, del'd Cleve'd.	4.25c.
No. 6 industrial, del'd Cleve'd.	4.00c.

COKE

Per Net Ton

Furnace, f.o.b. Connells-ville, Prompt	\$5.00 to \$5.50
Foundry, f.o.b. Connells-ville, Prompt	5.75 to 6.25
Foundry, by - product Chicago ovens	10.50
Foundry, by - product del'd New England.	12.50
Foundry, by - product del'd Newark or Jersey City	11.38 to 11.90
Foundry, by - product Philadelphia	11.13
Foundry, by - product delivered Cleveland ..	11.05
Foundry, by - product delivered Cincinnati ..	10.50
Foundry, Birmingham.	7.50
Foundry, by - product del'd St. Louis industrial district	10.75 to 11.00
Foundry, from Birmingham, f.o.b. cars dock Pacific ports	14.75

The Week's Market News

(CONTINUED FROM PAGE 81)

rolled, the tendency to buy hot rolled pickled and expect cold rolled quality will be lessened.

Cold rolled sheet prices have been reaffirmed on shipments up to and including the end of the first quarter, but shipments made after March 31, 1940, will be invoiced at prices in effect at the time of shipment. The same conditions apply to electrical sheets, vitreous enameling sheets, galvanized sheets, long ternes and black plate, according to the announcement by the leading producer.

The price changes are not expected to alter appreciably the trend of new business. Many buyers have already covered for first quarter. Considerable tonnage, notably from railroad car builders, is still to be placed for first quarter. Some mills already are sold out on sheets for the first three months of 1940. Specifications against previously placed sheet orders are almost all in to date, incoming business consisting largely of fresh demand. A decline in the volume of business around the first of the year would not be a surprise in view of the exceedingly large tonnages placed during the final quarter of 1939.

At CLEVELAND and YOUNGSTOWN the jam on narrow hot strip continues unabated, since backlogs are greatly extended, production facilities hard pressed and pressure for deliveries very strong. After a dip in new business just prior to Thanksgiving, activity spurted after the holiday had passed. Demand for galvanized sheets for first quarter shipment is described as light.

In some cases, fresh sheet and strip business at PITTSBURGH has leveled off slightly in the past week but no major change has occurred in backlogs.

Forward buying of sheet steel in the SOUTHERN OHIO district has brought order books to practical completion through January.

IRON ORE

... Season's total for Lake movement will be about 45,000,000 tons

VESSEL shipments of Lake Superior iron ore this month will be among the heaviest recorded since November, 1917, when 7,333,000 tons came down the Great Lakes. The

movement has been dropping sharply in the last few days, and principal docks are already closed or are closing this week. If the movement reaches 6,000,000 tons this month, the season's total will be around 45,000,000 tons, against 19,263,000 tons last season.

... COKE ...

... Ovens to be charged after eight years' idleness

THE Brier Hill coke ovens at YOUNGSTOWN will be charged soon after eight years of idleness, resulting in 100 per cent by-product coke

production at YOUNGSTOWN. The situation at CLEVELAND whereby coke was being brought from near PITTSBURGH pending the reconditioning of CLEVELAND batteries, and pig iron shipped back to the PITTSBURGH district, is being alleviated.

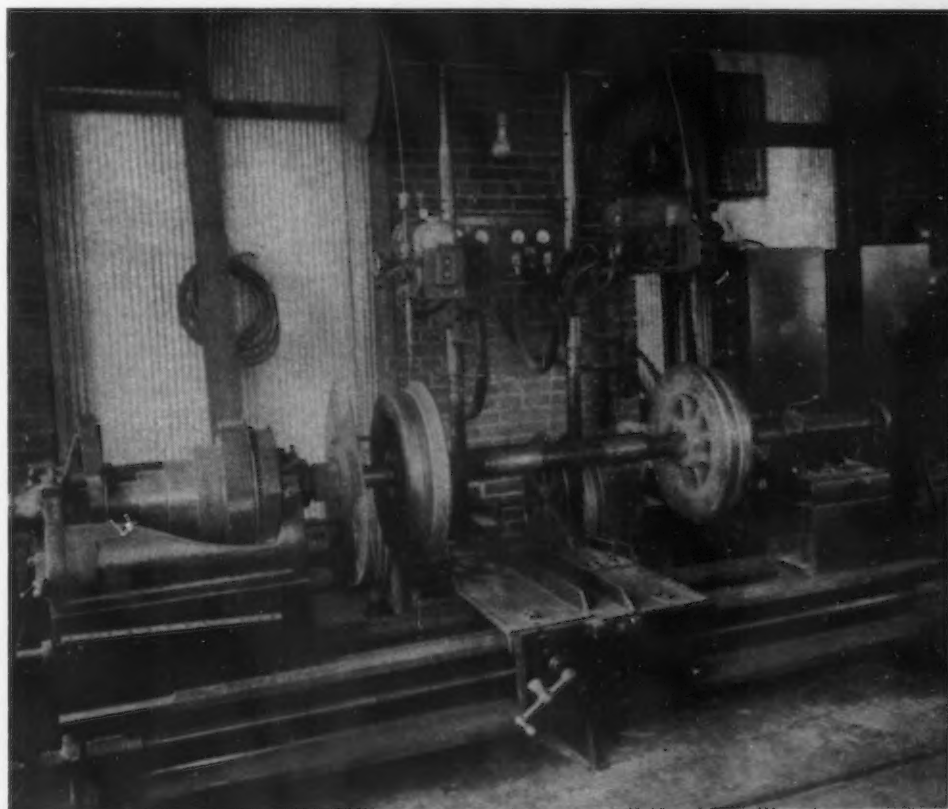
TIN PLATE

... Unchanged price expected ...
Operations remain at 97%

OFFICIAL announcement by the leading producer on tin plate prices for the first quarter had not been made at press time but in view of information on other steel products, no change is expected. An announcement probably will be made this week. Operations remain at 97 per cent of capacity.

AFTER many years experience in welding worn mine locomotive tires, Peabody Coal Co. has developed a technique that has resulted in no subsequent breakage of tires whatsoever. Several elements figure in the successful process. First, the worn-out tire is preheated. Then, during the welding procedure, a continuous motor-operated peening hammer is directed on the new bead while the wheel is slowly cooling in a heat in-

sulated case. Among the equipment used are General Electric arc-welding sets together with automatic wire feed heads, torch, peening unit, and converted welding lathe. Since in most cases the deposited material is softer than the original tire, the repaired unit actually has more traction than it had when new. However, a hard surface may be put on if that seems preferable. Average cost is \$11 per tire.



PLANT EXPANSION AND EQUIPMENT BUYING

◀ NORTH ATLANTIC ▶

General Electric Co., Schenectady, N. Y., has approved plans for one-story addition to branch plant at Lynn, Mass., 62 x 128 ft. Cost close to \$50,000 with equipment.

Air Reduction Sales Co., 60 East Forty-second Street, New York, acetylene welding and cutting equipment, etc., has let general contract to Albert M. Higley Co., 2036 East Twenty-second Street, Cleveland, for one and two-story addition, 39 x 80 ft., to branch plant at Cleveland. Cost about \$45,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 5 for 55,250 sq. ft. of galvanized steel expanded metal (Schedule 7786) for Brooklyn, Sewall's Point and Mare Island Navy yards.

Consolidated Coppermines Corp., 120 Broadway, New York, is considering new concentrating mill near mining properties at Kimberly, Nev., ore storage and handling structures, machine shops, power house and other facilities; also development of copper-mining properties and installation of equipment. Entire project will cost close to \$5,000,000. Ira B. Joralemon, 315 Montgomery Street, San Francisco, mining engineer, has been engaged to make surveys.

National Biscuit Co., 449 West Fourteenth Street, New York, plans new one-story baking plant at East Fortieth Avenue and Steele Street, Denver, Colo. Cost close to \$1,000,000 with equipment, including multiple-unit traveling ovens, mechanical mixers, conveyors, air-conditioning system and other equipment. Louis Wirsching, Jr., first noted address, is company architect and engineer. Present Denver plant and offices are at Nineteenth and Blake Streets.

Board of Education, Park Avenue and Fifty-ninth Street, New York, plans new four-story and basement Benjamin Franklin High School on East River Drive, 114th to 116th Streets, with vocational department consisting of seven shops, with six science rooms, laboratories, etc. Cost about \$2,750,000 with equipment, exclusive of site. Work is scheduled to begin early in spring. Bureau of Construction, 40 Flatbush Avenue Extension, Brooklyn, is in charge; Eric Kebben, last noted address is architect for board.

Pressed & Welded Steel Products Co., 38-61 Eleventh Street, Long Island City, has plans for one-story addition. Cost close to \$40,000 with equipment. Roger Garland, 10 East Fortieth Street, New York, is architect.

Bell Telephone Laboratories, Inc., 463 West Street, New York, has let general contract to John Lowry, Inc., 630 Fifth Avenue, New York, for new plant at Murray Hill, New Providence Township, N. J., consisting of group of T-shaped buildings for electrical, mechanical and other technical laboratories, shops and miscellaneous buildings. Cost about \$3,000,000 with equipment.

Bendix Aviation Corp., Bendix, near Hasbrouck Heights, N. J., has begun work on one-story addition, 100 x 300 ft., for production of alloy metal castings. Andrew Christensen, 80 Broad Street, Elizabeth, N. J., is contractor. Cost close to \$100,000 with equipment.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until Dec. 4 for one automatic drilling and gaging machine for production of fuze-well cups (Circular 730); until Dec. 6, reworking scrap metals (Circular 684); until Dec. 11, metal parts for unit boosters (Circular 735).

Western Electric Co., Inc., 195 Broadway, New York, telephone and other electrical equipment, subsidiary of American Telephone & Telegraph Co., has organized Specialty Products Division, a new branch, for production of broadcasting equipment, police radio prod-

ucts, sound systems, etc. Manufacturing department will be established at company works at 100 Central Avenue, Kearny, N. J.

Rheem Mfg. Co., 105 Avenue L, Newark, N. J., steel drums, barrels, etc., has filed plans for one-story addition, 120 x 140 ft., for which general contract recently was let to Brown & Matthews, Inc., 122 East Forty-second Street, New York.

Resinous Products & Chemical Co., 222 West Washington Square, Philadelphia, industrial chemicals, synthetic resins, etc., has let general contract to Frank V. Warren, Inc., Lewis Tower Building, for four-story addition to plant at Richmond and Kennedy Streets. Cost about \$100,000 with equipment.

Henry Disston & Sons, Inc., Unruh and Milnor Streets, Philadelphia, saws, tools and steel specialties, has approved plans for one-story addition for expansion in light armor plate production division. Cost about \$250,000, of which about \$185,000 will be used for equipment.

◀ BUFFALO DISTRICT ▶

MacRae Machinery Co., 501 East Water Street, Syracuse, N. Y., has approved plans for one-story plant on East Erie Boulevard, superstructure to begin at once. Cost close to \$45,000 with equipment. Paul Hueber, 224 Harrison Street, is architect.

General Foods Corp., 250 Park Avenue, New York, plans extensions and improvements in branch Jell-O Division plant, Le Roy, N. Y. Cost about \$50,000 with equipment.

Swanson Machine Co., 59 Hopkins Avenue, Jamestown, N. Y., machinery and parts, has rescinded general contract recently let for one-story addition, 65 x 100 ft., and will carry out erection by day labor. Cost close to \$50,000 with equipment. O. R. Johnson, Fenton Building, is architect.

◀ NEW ENGLAND ▶

Johnson Steel & Wire Co., Inc., 53 Wiser Avenue, Worcester, Mass., has approved plans for one-story addition, 25 x 200 ft. Cost over \$45,000 with equipment.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until Dec. 4 for one vertical, rotary head milling machine, tool and die; and motor-driven horizontal, toolroom milling machine (Circular 173); electric tempering furnace, convection type (Circular 181).

Monsanto Chemical Co., 600 Worcester Street, Springfield, Mass., will take bids soon on general contract for three-story addition to branch plant at Indian Orchard, Mass. Cost over \$130,000 with equipment. F. G. Grone-meyer is company engineer, address noted. Main offices are at St. Louis.

Bureau of Yards and Docks, Navy Department, Washington, will take bids soon for one-story shop at Boston Navy Yard, South Boston, in connection with quay wall about 2000 ft. long.

Thompson Wire Co., 41 Mildred Avenue, Boston, flat and round wire products, has let general contract to Fiske-Carter Construction Co., 8 Norwich Street, Worcester, Mass., for three one-story additions to plant at Worcester, two structures, each about 32 x 120 ft., and one, 25 x 80 ft. Cost over \$50,000 with equipment.

◀ WASHINGTON DIST. ▶

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Dec. 6 for two diesel engine-generator units, oil purifiers, heat exchangers, tanks, pumps, exciters, starting-air equipment and switchgear for naval station at Guantanamo, Cuba, and navy yard at Cavite, P. I. (Specifications 9538); until Dec. 20, two graving docks at navy yard, Pearl Harbor, T. H. (Specifications

9100); also bids (no closing date stated) for temporary storehouse at Marine Barracks, Quantico, Va. (Specifications 9359).

Hatteras Oil Co., E. Victor Cauldfield, Eastern Tar Products Co., 603 Lexington Boulevard, Norfolk, Va., head, plans new bulk oil storage and distributing plant on waterfront terminal site at Morehead City, N. C., with pumping station, tank storage for 750,000 gal., and other operating facilities. Cost close to \$100,000 with equipment.

Chemical Warfare Service, Edgewood Arsenal, Edgewood, Md., asks bids until Dec. 6 for one 12,000-gal. aluminum alloy tank (Circular 303); four conveyors (Circular 300).

Board of Trustees, St. Vincent's Male Orphan Asylum, York Road and Five-Mile Lane, Baltimore, will take bids soon for addition to steam power house including boiler and auxiliary equipment. Eiser & Akers, 916 North Charles Street, are consulting engineers.

General Purchasing Officer, Panama Canal, Washington, asks bids until Dec. 4 for six cast manganese steel switch tongues (Schedule 3745).

Fruehauf Trailer Co., 10940 Harper Avenue, Detroit, motor trailers and parts, has let general contract to Kirson Construction Co., 339 St. Paul Place, Baltimore, for one-story factory branch, storage and distributing plant at Baltimore, about 100 x 100 ft., with part two stories, for office service. Cost close to \$50,000 with equipment. Kubitz & Koenig, Emerson Tower Building, Baltimore, are consulting engineers.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 5 for welding rods and electrodes (Schedule 7774), carbon and high-speed twist drills (Schedule 7762), wood boring bits, chisels, gouges, knives, etc. (Schedule 7757) for Eastern and Western yards; steel boiler tubes, including carbon steel (Schedule 7801) for Norfolk, Mare Island, Eastern and Western yards.

◀ SOUTH ATLANTIC ▶

John Deere Plow Co., Moline, Ill., agricultural implements and machinery, has let general contract to Hardin & Ramsey, 161 Spring Street, N. W., Atlanta, Ga., for one-story factory branch, storage and distributing plant at Albany, Ga. Cost close to \$50,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Dec. 6 for steel airplane hangars at Jacksonville naval air station, Banana River naval air station, and Key West naval air station, all Florida (Specifications 9536).

Florida Power & Light Co., Miami, Fla., is having plans drawn by Phoenix Utility Co., 2 Rector Street, New York, for addition to steam-electric generating station at Dania, Fla., to include turbo-generator unit, boilers and auxiliary equipment. Same company also will supervise construction. Cost close to \$3,000,000 with equipment.

◀ SOUTH CENTRAL ▶

Tube-Turns, Inc., 224 East Broadway, Louisville, manufacturer of seamless drawn fittings, welding specialties, etc., has let general contract to Austin Co., Cleveland, for three one-story additions, 160 x 240 ft., 120 x 180 ft., and 50 x 120 ft., for expansion in manufacturing department, storage and distribution. Cost over \$85,000 with equipment.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until Dec. 12 for upper and lower lock gates for Kentucky dam power development, totaling about 1814 tons of steel and castings.

Carthage Coca-Cola Bottling Co., Carthage, Miss., has let general contract to Walter L. Perry Construction Co., Philadelphia, Miss., for one-story mechanical-bottling plant. Cost close to \$40,000 with equipment. James M. Spain, Deposit Guaranty Bank Building, Jackson, Miss., is architect.

Board of Education, Owensboro, Ky., will take bids soon on general contract for new three-story and basement vocational high school, 180 x 180 ft. Cost over \$100,000 with equipment. E. C. and G. T. Landberg, 114 Garfield Place, Cincinnati, are architects.

◀ SOUTHWEST ▶

Columbia Brewing Co., 2000 Madison Street, St. Louis, has asked bids on general contract for one-story top addition, 52 x 76 ft., to storage and distributing building. Cost over \$65,000 with equipment. Janssen & Janssen, Chemical Building, are architects.

Board of City Commissioners, Stillwater, Okla., plans expansion and improvements in municipal power plant and waterworks station, including new 4000-kw. turbine-generator unit and accessories, boiler, feed-water heater and auxiliary equipment. Cost close to \$290,000. Financing is being arranged through bond issue.

Swift & Co., National Stock Yards, St. Louis, have let general contract to A. H. Haeseler Building & Contracting Co., 2346 Palm Street, for one and two-story addition to meat-packing plant, 53 x 85 ft., at 3815 Chouteau Avenue. Cost over \$50,000 with equipment.

Department of Interior, Washington, asks bids until Dec. 20 for power plant at Chillicothe School, Chillicothe, Okla. (Circular 5647).

Meyer Kornblum Packing Co., 300 Central Avenue, Kansas City, Kan., meat packer, has let general contract to Wyatt Construction Co., 1609 Nebraska Avenue, for two-story and basement addition, 50 x 120 ft. Cost over \$65,000 with equipment. Carl Schloemann, 6329 San Bonita Avenue, Clayton, St. Louis, is architect.

Hobbs Mfg. Co., 1001 Throckmorton Street, Fort Worth, Tex., motor trailers and parts, has leased one-story building at San Antonio, Tex., heretofore occupied by San Antonio Body Co., and will improve for factory branch, service, repair and distributing branch.

Commanding Officer, Ordnance Department, San Antonio Arsenal, San Antonio, Tex., asks bids until Dec. 11 for dies, taps, threading sets, hammers, clippers, planes, etc., comprising 61 different items in all (Circular 27).

◀ WESTERN PA. DIST. ▶

Calig Steel Barrel Co., 200 South Twenty-first Street, Pittsburgh, steel barrels, drums, etc., has asked bids on general contract for one-story addition, 80 x 110 ft., for storage and distribution. Cost close to \$40,000 with equipment. Murray M. Levine, 5100 Fifth Avenue, is architect.

Erie Meter Systems, Inc., 2402 Pearl Street, Erie, Pa., gasoline pumps, parts, etc., has approved plans for one-story addition, 90 x 135 ft. Cost about \$45,000 with equipment. L. R. Olson is company engineer in charge.

Pennsylvania Refining Co., Butler Savings & Trust Building, Butler, Pa., plans expansion and improvements in oil refinery at Titusville, Pa., including three one-story additions, 40 x 50 ft., 40 x 60 ft., and 35 x 56 ft., with equipment for wax manufacture and other by-products processing. Cost over \$90,000 with equipment.

◀ OHIO AND INDIANA ▶

Taylorcraft Aviation Corp., Alliance, Ohio, airplanes and parts, has let general contract to Don Edwards Co., Alliance, for one-story plant for parts production and assembling. Cost close to \$50,000 with equipment.

Anchor Rubber Products, Inc., 17325 Euclid Avenue, Cleveland, molded rubber products, has leased for expansion one-story building, 35 x 300 ft., to be erected by Euclid Corp., Cleveland, adjoining present mill on London Road. Cost over \$70,000 with equipment. Erection contract has been let to MacDougall Co., 5410 Stone Avenue. H. J. Hassler, 700 Prospect Avenue, is architect.

H. H. Meyer Packing Co., Central Avenue and Linn Street, Cincinnati, meat packer, has let general contract to Meyer-Hecht Co., 2824 Stanton Avenue, for four-story and basement addition. Cost over \$75,000 with equipment. Tietig & Lee, 34 West Sixth Street, are architects.

Thompson Products, Inc., 2196 Clarkwood Road, Cleveland, automotive equipment, valves, bolts, etc., has let general contract without competition to Sam W. Emerson Co., 1836

Euclid Avenue, for main one-story addition, 150 x 166 ft., and one-story adjoining structure, 84 x 100 ft., latter for engineering division. Cost about \$100,000 with equipment. Christian, Schwarzenberg & Gaede, 1836 Euclid Avenue, are architects.

Contracting Officer, Materiel Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until Dec. 4 for 20 electric power plants (Circular 576); until Dec. 5, eight 5-ton and 62 2-ton spur gear chain hoists (Circular 613), single-cylinder test engine and cylinder adaptor (Circular 592).

Bendix Aviation Co., Bendix Drive, South Bend, Ind., has authorized appropriation of \$2,000,000 for expansion and improvements in aviation equipment-manufacturing plants in different parts of country during next eight months, bulk of fund to be used for machinery purchases.

Globe Roofing Products Co., 2211 Schrage Avenue, Whiting, Ind., has asked bids on general contract for two-story and basement addition. Cost about \$45,000 with equipment. Isadore H. Braun, 123 West Madison Street, Chicago, is architect.

◀ MICHIGAN DISTRICT ▶

McInerney Spring & Wire Co., Grand Rapids, Mich., steel springs, wire goods, etc., has purchased greater part of former local plant of Luce Furniture Corp., totaling about 460,000 sq. ft. of floor space, and will improve at once to replace plant destroyed by fire Oct. 30, with loss close to \$450,000 with machinery.

Pent-Hex Corp., Muskegon, Mich., affiliated with West Michigan Consumers Co., same place, plans new natural gasoline processing plant near Grand Rapids, Mich., with compressor plant, steel tank storage department and other facilities. Work is scheduled to begin soon. Cost close to \$100,000 with equipment.

Buell Die & Machine Co., 3545 Scotten Avenue, Detroit, steel dies, tools and other mechanical equipment, has let general contract to Krieghoff Co., 6661 French Road, for one-story addition and improvements in present plant. Cost about \$40,000 with equipment. H. D. Ilgenfritz, 468 Prentiss Street, is architect.

◀ MIDDLE WEST ▶

American Flange & Mfg. Co., Inc., 825 South Kilpatrick Avenue, Chicago, steel products, has let general contract to Elmo L. Ward, 4722 Arthington Street, for one and two-story addition and improvements in present plant. Cost close to \$45,000 with equipment.

Armstrong Paint & Varnish Co., 1350 South Kilbourn Avenue, Chicago, plans multi-story top addition, 60 x 100 ft. Cost over \$65,000 with equipment. Edward H. Nordlie Co., 4825 North California Street, is architect.

E. I. duPont de Nemours & Co., Cellophane Division, Wilmington, Del., will take bids soon on general contract for branch plant near Clinton, Iowa, with main unit to be one and five stories, 250 x 750 ft., and several smaller structures, power house, machine shop and other mechanical departments. Cost close to \$5,000,000 with machinery. Award for excavations has been made to A. M. Paulson Co., Clinton. A branch line to plant site is being built for connection with Rock Island and Northwestern railway systems.

City Council, Fennimore, Wis., has plans for new municipal power plant, using diesel engine-generating units and accessories. Cost about \$70,000. George H. Leiser, Portage, Wis., is consulting engineer.

United States Engineer Office, Fort Peck, Mont., asks bids until Dec. 6 for requirements for parts for tractors during period from Jan. 1 to June 30, 1940 (Circular 102).

Tyler Brothers Coca-Cola Bottling Co., Villisca, Iowa, has asked bids on general contract for new two-story mechanical-bottling plant at Atlantic, Iowa, 80 x 105 ft. Cost over \$50,000 with equipment. Dougher, Rich & Woodburn, Old Colony Building, Des Moines, Iowa, are architects.

Banquet Baking Co., Rock Island, Ill., has let general contract to Weisman Construction

Co., Moline, Ill., for one-story baking plant, 42 x 145 ft., at 2009 Fourth Avenue. Cost close to \$45,000 with ovens, conveyors, mixers and other equipment. Swanson & Maiwald, Cleveland Building, Rock Island, are architects.

◀ PACIFIC COAST ▶

Coca-Cola Bottling Co. of California, Ltd., 3545 East Fourteenth Street, Oakland, Cal., has let general contract to Engineers, Ltd., 225 Bush Street, San Francisco, for new one and two-story mechanical-bottling plant at Oakland. Cost over \$50,000 with equipment. Edward T. Foulkes, 357 Twelfth Street, Oakland, is architect.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Dec. 13 for one 10-ton electric and one 7½-ton hand-operated bridge cranes (Specification 8616) for naval air station, Alameda, Cal.; also bids (no closing date stated) for boat house at same station (Specifications 9506).

Municipal Transportation Commission, Seattle, plans machine and repair works in large municipal service and garage building for new system of trackless trolleys and motor buses. Cost about \$325,000 with equipment. McClelland & Jones, Republic Building, and Thomas, Grainger & Thomas, Arcade Building, are architects; Lincoln Boulton, Fourth Avenue Building, is consulting engineer.

John W. Maloney, Larson Building, Yakima, Wash., architect, is preparing plans for one and multi-story J. M. Perry Trade School for boys, for which private donation is being made. Cost over \$400,000 with equipment.

Commanding Officer, Ordnance Department, Benica Arsenal, Benica, Cal., asks bids until Dec. 5 for one motor-driven, 24-in. heavy-duty shaper (Circular 31).

Quartermaster, Fort Huachuca, Ariz., is arranging call for bids for a convertible gas-diesel engine-generating unit and accessories, for local power plant.

E. H. Dahlman Co., Vista, Cal., fruit packer, will award general contract soon for new two-story and part basement packing plant, 75 x 125 ft. Cost over \$50,000 with equipment. Frank L. Hope, Jr., San Diego Trust & Savings Building, San Diego, Cal., is architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 5 for two steering engines, combined electric and hand, with steering stand units, controllers, switches, etc. (Schedule 7791) for Mare Island Navy Yard; three 18-in. motor-driven metal-cutting band saws (Schedule 7775) for Puget Sound yard.

◀ FOREIGN ▶

City Electric Light Co., Ltd., Brisbane, Queensland, Australia, will receive bids until Jan. 15 for two steam boilers and auxiliary equipment for power plant (Specifications No. 273).

Imperial Oil Co., Ltd., 56 Church Street, Toronto, Ont., plans extensions and improvements in oil refinery at Regina, Sask. Cost over \$125,000 with equipment.

Inland Steel Co. has declared a special dividend of \$1.50 per share, payable Dec. 20 to stockholders of record Dec. 5. This brings the total dividends declared for payment during 1939 to \$4 per share.

Allegheny Ludlum Steel Corp. has declared a year-end dividend of 50c. on common stock, payable Dec. 21 to shares of record Dec. 4.

Whitcomb Locomotive Co. of Rochelle, Ill., a subsidiary of the Baldwin Locomotive Works, has appointed the following sales representatives: Edward M. Sansom as district sales manager with offices at 120 Broadway, New York; B. L. Beck as district sales manager with offices at 1010 Pine Street, St. Louis, Mo.; John R. Heckman as salesman, operating from the Chicago offices, at 627 Railway Exchange Building.

THIS WEEK'S MACHINE ... TOOL ACTIVITIES ...

... Export business ahead of domestic volume, largely as a result of huge French program ... Machine tool plants expanding to meet demands taxing their capacity for over six months ahead ... Current ordering, however, has tapered slightly ... Aircraft industry a leading factor.

Foreign Orders Topping Domestic Demand

CINCINNATI—While new machinery business continues to come in at better than average rate, ordering has lost a good bit of its "rush" appearance. Of course, a large factor in reducing the over-aggressive appearance of business has been the fact that district factories are forced to extend deliveries well into the future. On the average, deliveries are now about five to six months in the future, with some plants quoting eight, nine and 10 months on current requests. With France and England most active in the current market, export business is still topping the domestic by a fair margin. The domestic demand, however, is most encouraging and appears to be steady. While figures for November are not yet completed, reports indicate that it probably will be close to the best, if not the best, month of the current year. One interest indicated that business so far during the month of November has exceeded any other month in the history of the company. Reports from other manufacturers indicate that bookings have been unusually good during the current period. New business runs the whole gamut of tools with the heaviest requests for lathes, millers and grinders.

Supply of good skilled labor is becoming increasingly limited, but manufacturers indicate no hysteria in attempting to get employees. Employment is reported available for good skilled men of loyal disposition and plant operation is being limited to such. Manufacturers show no disposition to go into mushroom expansion but prefer to schedule current business on presently available plants, with expansion of output limited to the gradual extension of night forces.

Aircraft Demands A Leading Sales Factor

CLEVELAND — Orders continue to mount for producers in this area. Recent sales are headlined by around 35 machines for an Eastern airplane plant and a larger group for a plant in France.

The amount of inquiry which is developing from abroad appears greater than expected and considerably beyond production available in the next six months. The French mission is now well straight-

ened out on its aircraft equipment program and will undertake other matters including artillery requirements.

Expansion of production facilities, through plant additions and new companies, will provide a certain amount of relief in about three months.

Rockford Plants Scheduled Far Into 1940

CHICAGO—A survey of Rockford machine tool plants late last week revealed no change in the boom production conditions of September and October. Declines in new business over the past two weeks are an indication perhaps that some of the large-scale buying of the previous two months is at an end. Orders, however, for the time being are expected to continue numerous, but more normal in character. The percentage of work destined for export in Rockford plants ranges from 30 to more than 50 per cent. At least one plant has established a set ratio of foreign to domestic business and will not take a single machine for export after that point has been reached. The earliest delivery being quoted on a score of various machines is four to five months, while in some cases not a single new order can be shipped until November, 1940. Builders are quite worried over the long deliveries as they will affect prices. For self-protection, several have announced increases. In one plant, where a 10 per cent price boost was put into effect last month, another 10 per cent rise will apply on all machines shipped after June 1. All deliveries after Jan. 1 will be subject to a 10 per cent price increase, another manufacturer announced.

A considerable volume of the backlogs at Rockford plants consist of domestic orders, even though the foreign influence is large. One plant which prior to September had nearly all foreign work in the shop reported that its ratio today is more nearly half and half, the increase being entirely domestic. In spite of the fact that foreign orders alone would enable the plants to work at capacity, careful attention is being given domestic customers and preferential deliveries afforded them when possible. Even on schedules extending far into 1940 because of export demand, room is being left for the domestic orders that may develop at that time.

A slight decline in orders has been no-

ticed by Chicago dealers in the last week. Sellers attribute this largely to the bad delivery situation, but say that interest in new machinery is undiminished. The Rock Island arsenal continues the major local customer.

Aircraft Buying a Sustaining Factor in the East

NEW YORK—With deliveries now extended well into 1940, those in urgent need of machine tools, like the aircraft engine and parts industry, are already making extensive commitments for next year. Some large programs are being discussed and equipment lined up for purchase, though not quite on the grand scale of a few months ago. Buying on the part of the arsenals and the Navy also continues in volume. Against this background of military business there is a fairly general demand for machinery that would be considered much better than average in a normal market.

Local dealers are not involved in the huge French machine tool purchasing program, since all business is done directly with the factories, but they have been swamped with visiting principals. The French orders may total close to \$100,000,000 and include such large amounts of machinery as to make it difficult to see how the machines can be delivered in a reasonable time. British buying is still being handled through regular channels abroad. Most builders are allocating a portion of their production for foreign orders and are leaving openings for domestic business to be received later on. Many machine tool builders in the East are engaged in expansion programs to meet the huge demand.

The Van Norman Machine Tool Co., Springfield, Mass., reports a backlog of orders amounting to around \$1,500,000, of which foreign business accounts for roughly 50 per cent. There are 600 persons on the company's payroll, an increase of 50 per cent as compared with a year ago.

Used Machinery Brings High Prices at Detroit

DETROIT—First indications of a munitions manufacturing program in Detroit on a substantial scale (not an educational order) is the rumor that Chrysler will bid on 75 mm. shells. A machine tool program is being outlined for such a set-up. Other Chrysler plants also are reported interested. General Motors Diesel has recently bought some production tools, also a variety of gaging equipment in quantities. Used machinery auctions are bringing out a large and active group of bidders. Federal court has authorized sale of 2080 pieces of Reo machinery and equipment, appraised at \$900,000. A recent auction near Detroit brought nearly-new prices on some equipment that had seen a lot of use. The trade expects automobile companies to buy used equipment, rebuilt, to clear up objectionable bottle-necks or to help out on 1941 design changes, if new machinery cannot be obtained.

PRODUCTS INDEX

BILLETS—Forging

Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., The, Newport, Ky.
Harrisburg (Pa.) Steel Corp.
Republic Steel Corp., Cleveland, Ohio.

BILLETS—Re-rolling

Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., The, Newport, Ky.

BILLETS—Steel

Bethlehem (Pa.) Steel Company.
Continental Steel Corp., Kokomo, Ind.
Harrisburg (Pa.) Steel Corp.
Jones & Laughlin Steel Corp., Pittsburgh.
Tennessee Coal, Iron & Railroad Co.
(U. S. Steel Corp. Subsidiary), Birmingham, Ala.

BLANKS—Chisel

Cleveland (Ohio) Punch & Shear Works
Co., The.
Cleveland Steel Tool Co., The, 660 E.
82nd St., Cleveland, Ohio.

BLANKS—Gear and Pinion

Chicago (Ill.) Rawhide Mfg. Co., The,
1306 Elston Ave.

BLANKS—Gear, Silent Steel

Waldron, John, Corp., New Brunswick,
N. J.

BLAST CLEANING EQUIPMENT

American Foundry Equipment Co., The,
510 S. Byrkit St., Mishawaka, Ind.
Pangborn Corporation, Hagerstown, Md.

BLAST FURNACES

Brassett, H. A., & Co., Chicago, Ill.

BLAST GATES

Rockwell, W. S., Co., 50 Church St., N.Y.C.

BLOCKS—Chain

Yale & Towne Mfg. Co., The, Phila. Div.,
Phila., Pa.

BLOWERS

American Blower Corp., 6000 Russell St.,
Detroit.
Buffalo (N. Y.) Forge Co., 492 Broadway.

BLOWPIPES—Oxy-Acetylene Welding & Cutting

Linde Air Products Company, The, 30 East
42nd St., N. Y. C.

BLOWPIPES—Soldering, Heating, Annealing

American Gas Furnace Co., Elizabeth,
N. J.

BOILERS—Waste Heat

Babcock & Wilcox Co., The, 85 Liberty
St., N. Y. C.

BOILERS—Water Tube

Babcock & Wilcox Co., The, 85 Liberty
St., N. Y. C.

BOLT CUTTERS

Landis Mch. Co., Inc., Waynesboro, Pa.
National Machinery Co., Tiffin, Ohio.

BOLT AND NUT MACHINERY

Ajax Mfg. Co., The, Cleveland, Ohio.
Landis Machine Co., Inc., Waynesboro, Pa.
National Machinery Co., Tiffin, Ohio.
Waterbury (Conn.) Farrel Fdry. & Mch.
Co., The.

BOLT & RIVET CLIPPERS

Helwig Mfg. Co., St. Paul, Minn.

BOLTS—Carriage and Machine

Cleveland (Ohio) Cap Screw Co., The.
Russell, Burdick & Ward Bolt & Nut
Co., Port Chester, N. Y.
Triplex Screw Co., Cleveland.

BOLTS—Special

Russell, Burdick & Ward Bolt & Nut
Co., Port Chester, N. Y.

BOLTS—Stove

Progressive Mfg. Co., Torrington, Conn.

BOLTS—Stove, Recessed Head

American Screw Co., Providence, R. I.

BOLTS—Track

Carnegie-Illinois Steel Corp. (U. S. Steel
Corp. Subsidiary), Pittsburgh & Chi-
cago.

BOLTS AND NUTS

American Screw Co., Providence, R. I.
Clark Bros. Bolt Co., Milldale, Conn.
Republic Steel Corp., Cleveland, Ohio.
Russell, Burdick & Ward Bolt & Nut
Co., Port Chester, N. Y.
Triplex Screw Co., Cleveland.

BOND—Grinding Wheel

Bakelite Corp., 247 Park Ave., New York
City.

BORING BARS

Bullard Co., The, Bridgeport, Conn.
Carboloy Co., Inc., 11153 East 8-Mile
Road, Detroit, Michigan.
Gisholt Machine Co., Madison, Wisconsin.

BORING, DRILLING & MILLING MACHINES—Horizontal

Giddings & Lewis Machine Tool Co., Fond
Du Lac, Wis.
Hill-Clarke Mchry. Co., 647 W. Washing-
ton Blvd., Chicago.
Lucas Machine Tool Co., Cleveland.
National Automatic Tool Co., Richmond,
Ind.

BORING & DRILLING MACHINES—Vertical

Baker Bros., Inc., Toledo, Ohio.
Bullard Co., The, Bridgeport, Conn.

BORING MACHINES—Diamond & Carbide Tools

Heald Machine Co., Worcester, Mass.

BORING MACHINES—Jig

Pratt & Whitney Div. Niles-Bement-Pond
Co., Hartford, Conn.

BORING MACHINES—Precision

Cimatom Co., The, Dayton, Ohio.

BORING & TURNING MILLS—Vertical

Bullard Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Planer Co.

BRAKE LINING & BLOCKS—Asbestos

Manhattan Rubber Mfg. Div. of Ray-
bestos-Manhattan Inc., The, 2 Townsend
St., Passaic, N. J.

BRAKES—Electric

Clark Controller Co., The, Cleveland.
Cutler-Hammer, Inc., Milwaukee.
Electric Controller & Mfg. Co., The,
Cleveland.
Kiekhafer Corp., Cedarburg, Wis.

BRAKES—Electric & Mechanical

Clark Controller Co., The, Cleveland.
Electric Controller & Mfg. Co., The,
Cleveland.

BRAKES—Magnetic

Kiekhafer Corp., Cedarburg, Wis.
Stearns Magnetic Mfg. Co., 635 So. 28th
St., Milwaukee.

BRAKES—Metal Forming

Bryant Machinery & Engineering Co.,
Chicago.
Cincinnati (Ohio) Shaper Co., The.
Cleveland Crane & Engineering Co., The
Steelweld Machinery Div., Wickliffe,
Ohio.

Dreis & Krump Mfg. Co., Chicago.

Ferracute Machine Co., Bridgeton, N. J.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

BRICK—Fire Clay

Carborundum Co., The, Niagara Falls, N. Y.
Illinois Clay Products Co., Joliet, Ill.

BRICK—Insulating

Babcock & Wilcox Co., The, 85 Liberty
St., N. Y. C.

BRIDGE BUILDERS

American Bridge Co. (U. S. Steel Corp.
Subsidiary), Pittsburgh.
Belmont Iron Works, Philadelphia.

BRIDGE OPERATING MACHINERY—Movable

Earle Gear & Mch. Co., Philadelphia.

BRUQUETS—Ferroalloy

Electro Metallurgical Sales Corp., 30 East
42nd St., N. Y. C.

BROACHES

American Broach & Machine Co., Ann
Arbor, Mich.
Colonial Broach Co., Detroit.

BROACHING MACHINES

American Broach & Machine Co., Ann
Arbor, Mich.
Bullard Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Milling Mch. Co., The.
Colonial Broach Co., Detroit.
Lucas Machine Tool Co., Cleveland.
Olgear Co., The, 1311 W. Bruce St., Mil-
waukee.

BRONZE FOR DIES

Ameco Metal, Inc., Milwaukee, Wis.

BRONZE—Phosphor

Bunting Brass & Bronze Co., Toledo, Ohio.

BRUSHES—Machine

Pittsburgh Plate Glass Co., Brush Div.,
Baltimore, Md.

BRUSHES—Wire

Pittsburgh Plate Glass Co., Brush Div.,
Baltimore, Md.

BUCKETS—Clamshell

Blaw-Knox Div. of Blaw-Knox Co., Pitts-
burgh, Pa.

Cullen-Friedstedt Co., 1303 S. Kilbourn
Ave., Chicago.

Hayward Co., The, 50 Church St., N. Y. C.
Hevl & Patterson, Inc., Pittsburgh.

Industrial Brownhoist Corp., Bay City,
Mich.

Wellman Engineering Co., The, Cleve-
land.

BUCKETS—Electric Motor

Hayward Co., The, 50 Church St., N. Y. C.

BUCKETS—Orange Peel

Hayward Co., The, 50 Church St., N. Y. C.

BUFFERS & POLISHING MACHINES

Packer Machine Co., The, Meriden, Conn.

BUFFING APPLICATORS—Automatic

Packer Machine Co., The, Meriden, Conn.

BUFFING COMPOUND—Stainless & Other Steels

Harrison & Co., Haverhill, Mass.

BUILDINGS—Steel

American Bridge Co. (U. S. Steel Corp.
Subsidiary), Pittsburgh.
American Rolling Mill Co., Middletown,
Ohio.

Belmont Iron Works, Philadelphia.
Blaw-Knox Div. of Blaw-Knox Co., Pitts-
burgh, Pa.

Iron & Steel Products, Inc., Chicago.

BULLDOZERS

Ajax Mfg. Co., The, Cleveland, Ohio.
Cleveland Crane & Engineering Co., The
Steelweld Machinery Div., Wickliffe,
Ohio.

JUST BETWEEN US TWO

Invitation to Stick Out Our Neck

A Rapid City, S. D., reader writes:

"Will you kindly send us some information on future iron and steel market prices? We are much interested."

So are we. Even though our crystal ball is cracked and our ouija board is warped, the temptation to write a letter beginning, "As we see it . . ." is strong. But our hand is stayed by the record-high percentage of cervical fractures sustained recently by soothsayers who stuck their necks out as little as a month ahead.

Therefore, we are strangling our Delphic yarnings and are telling the gentleman that he himself can tell which way the ball is going by getting himself a seat smack on the 50-yard line. All he has to do is to read the play-by-play description of market developments as given here each week (see page 76) by our favorite family journal's staff of market experts.

Alphabet Soup Note

Couple of months ago someone wrote in that he is compiling a glossary of odd terms used in the industry—*sull*, *bosh*, *bod*, *kish*, and so on. He is falling behind in his homework if he missed a pair of classics in last week's article, "Control of Sulphur in Basic Open Hearth." They are *scruff* and *krish*.

And Whom Are You With?

E. L. Brandt, the managing secretary of The Engineering Society of Detroit ("The Largest Local Engineering Society in the World") informs The Iron Age ("The World's Greatest Industrial Paper") that those who attend the Society's meetings are supplied with cards having the name typed jumbo size.

The card is inserted in the upper outside coat pocket, with the name sticking out, informing all and sundry that you are JOSEPH FRANCIS McFEELY, III. This is a splendid idea, but Mr. Brandt should go one step further. He should add the company connection, in order to prevent you from embarrassing your neighbor, whose card is marked, say, "K. T. Keller," by remarking, "I think your Hydramatic drive is a honey."

"Of the" He Sings

As shown in the curve representing a typical cross-section of a surface, the r.m.s. value of the surface profile is the square root of the mean of the sum of the squares of the values being averaged. . . —The Iron Age

A very pretty thought.

Wants Limelight Dimmed

Bill Phair, our associate editor, who will soon have to do something about the way his trend lines on page 75 are bumping their heads against the ceiling, calls attention to this headline in the Elizabeth (N. J.) Journal:

OBSCURITY DRIVE TO THE PRESSED BY H. N. SOCIETY

A refreshing note in this publicity-mad age.

Puzzles

Our favorite problem is the one Thomas Abraham sent in about the monkey and the hunter. The hunter aims at monkey in a tree. The monkey releases his hold the instant the gun is fired, and regardless of the velocity of the bullet, the height of the tree, or the distance between hunter and monkey, the monkey is hit.

It caused quite some discussion here until several of the master minds proved that the monkey has a mathematical rendezvous with death, as certainly as two and two make four. Now C. W. Schuck of Crucible Steel, Pittsburgh, sends in a circular describing an apparatus you can buy for \$9.50, which demonstrates that Mr. Abraham and Isaac Newton were right. You blow a metal ball through a blow gun, aiming it at a can held against the ceiling by a magnet. When the ball leaves the muzzle it trips an electromagnetic release, the can falls and the ball hits it. Blow soft, blow hard, you always hit the can.

Diophantus died at age 84.

Help yourself to another slice of turkey neck if you can figure this out in five minutes:

A man is twice as old as his wife was when he was as old as he is now. When she reaches his present age, the sum of their ages will be 100 years. What are their ages?

—A.H.D.

Cullen-Friedstedt Co., 1303 S. Kilbourn Ave., Chicago.